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# Railway Age

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## DAILY EDITION

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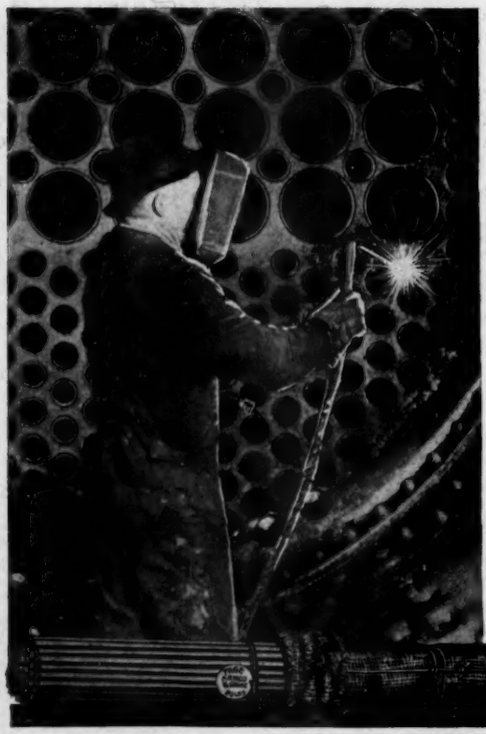

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# Railway Age

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**The Diesel Engine for Motor Cars**

The steadily increasing use of Diesel engines is one of the noticeable changes now taking place in engineering practice. American engineers have been followers in this field rather than leaders. For marine work it was left for European builders to make extensive applications of Diesel engines for propelling ships before American builders finally woke up to the fact that in many instances such motor ships were being operated at noticeably lower costs than similar modern ships using steam propulsion. Diesel engines are now being installed in American ships and the number so equipped would doubtless be much greater if the shipbuilding industry were not at present in a dormant condition. The Diesel engine has reached a high level of development and can be operated at a remarkably low cost for fuel and lubricating oils. Moreover, at present a number of European rail motor cars are being driven by such engines and they are reported to be highly satisfactory as regards reliability and operating costs. The most extensive applications have been in Sweden where transmission has been of the electric type. In view of the increasing demand in this country for larger rail motor cars than can be propelled by gasoline engines thus far developed for highway trucks, the advantages of the Diesel engine should be thoroughly investigated. Such engines would appear to be well suited for this particular service.

**Make Room for the Young Men**

It is to be hoped that Chairman Tollerton's invitation to the younger men to take an active part in the meeting will encourage some of the members who are not so well known to present their views on the floor. Nothing contributes more to the value of the meetings than free discussion and often men out on the line can give valuable suggestions from their intimate knowledge of the problems met in everyday operation. Apparently the younger members are diffident about talking on the floor, for a list of those who discuss the papers would usually read like a directory of superintendents of motive power and master car builders. Possibly this is partly due to the fact that committee work is delegated almost entirely to the higher officers. Would it not be a good thing to cut out some of the duplication in committees and give the younger men a chance?

**Watch the Car Situation**

Now is the time to prepare for the demand for coal cars that is sure to come with the settlement of the coal strike and the increase in business that regularly comes in the late summer and early fall. Why not line this strike cloud with silver and use the enforced idleness of the cars to put them in real serviceable condition? Such a small amount of coal is being carried now that there has been no opportunity for the usual storage for winter use, and when the strike is settled there is sure to be a great demand for cars. Making the repairs now when there is plenty of time and opportunity for doing the work will permit of making economical repairs, will mean a large saving in revenue when the rush comes and will greatly relieve congestion caused by defective equipment. Business is on the up-grade. Be sure you are ready to handle the peak load when it comes.

**How to Successfully Avoid Progress**

It would at times almost appear as though the railroads must have recruited many of their mechanical officers from the state of Missouri, and in addition must have limited applications for positions to those whose ideas had become fixed. This, at least, seems to be the impression frequently gained by the man who is trying to introduce some new mechanical device to the railroad field. If this attitude stopped with the demand for a statement as to what advantages might accrue from the use of the device and an investigation as to how the results arrived at were to be obtained, all would be well. Frequently, however, the attitude of mind goes further and no one appears to be willing to buy or even try something that has not yet become a demonstrated success on some other road—a fear of making a possible mistake that someone will find out about. No matter how well conceived any device may be, the records of the past show that very few ever amounted to anything until after they had passed through a long stage of development, and success was finally built up on the foundation of failure. Conservatism has a

place, but a fear to try anything because it might possibly not turn out well never accomplished anything except to act as an impediment to progress. Much greater advancement might be accomplished by a greater willingness to aid in necessary development work from which all would benefit.

**Why Present Electrical Reports?**

The report on train lighting equipment and practice presented yesterday morning was a carefully prepared report that contained a fund of valuable information, but as is usual with an electrical report presented to the Mechanical Division, it provoked no apparent interest. It was ably presented by E. W. Jansen, electrical engineer, Illinois Central, but he was the only one who discussed it. The report included data on car lighting, generator belts, specifications for lamps and lamp regulators, and outlined the present status of direct drive for car lighting generators. The report stated that at the present time there is no type of direct drive which does not include features that are objectionable to the extent of practically prohibiting its general use. At the same time it stated that there was a place for such equipment and it is entirely probable that apparatus will be developed which will meet all requirements. In his discussion Mr. Jansen showed how it was possible to save real money by improving the present method of belt drive, but this statement apparently fell on deaf ears. The same report will be presented before the Association of Railway Electrical Engineers, where, as usual, it will undoubtedly provoke lively discussion. What is the answer? The electrical department or departments on every railroad are growing rapidly and reports on electrical matters are becoming of ever-increasing importance, but apparently a meeting of the Mechanical Division is not the place to present them.

**Composite or All-Steel Car Construction?**

There is a wide difference of opinion among the railroads as to what constitutes the most economical type of open top car construction. For a period of about 20 years, ending with our entrance into the European war, the all-steel type of construction gained steadily in prestige. A shortage of steel for other than war purposes then forced the extensive building of cars of the composite type. Since the end of the war there has been evidence of a growing disposition to question the supremacy of the all-steel coal car, because maintenance costs have proved to be much higher than was expected when the type first received serious consideration. The maintenance characteristics of steel and wood cars differ widely. Cars with wood superstructures require frequent light repairs and, if well designed, can be given a general overhauling at a comparatively moderate cost. The all-steel car, on the other hand, requires comparatively little attention beyond running repairs until wear and corrosion necessitate extensive renewals of the side and hopper or floor sheets, when the sills are also frequently found to be badly corroded. This frequently entails completely rebuilding the car body, at a cost under current prices often greater than the original cost of the car. Both types require paint protection. The maintenance of a proper protective coat is much more difficult on the steel car and very much more important than on the car of composite construction, and consequently it is much more generally neglected. Furthermore, railroad repair points are much better fitted to take care of the composite cars. Where the life of the steel car does not exceed eight or ten years before rebuilding becomes necessary—and this is not exceptional—it becomes a serious question whether the composite type would not prove to be the more economical. Under conditions such that the steel car will operate for 15 years, the comparison may be much more favorable to the all-steel type of construction. The dissimilarity in the characteristics of the two cars makes a true comparison of the ultimate maintenance costs somewhat difficult, and in this connection it should be pointed out that the small but frequent repair jobs required on a car of wood or composite construction tend toward wastefulness which is less readily checked than in the case of the more extensive repairs usually required when the steel car comes into the shop. This question is one which cannot be answered except on the basis of a careful study in which differences in the local conditions are taken into consideration. Opinions formed without such a study are as likely to be wrong as to be right.

**Roller Bearings for Car Trucks**

There appears to be considerable interest in several European countries in the subject of roller bearings as applied to use on passenger and freight car journals. Several designs of such bearings are in service at the present time, and although it can not yet be said that any of them has passed the experimental stage, the results thus far obtained with some of them are quite encouraging. There has been a slight interest in the matter in this country also, although by no means as much as its importance would seem to warrant. There is no doubt that a successful adaptation of roller bearings here would effect noticeable economies in the costs of train operation. The ability to run for relatively long periods of time without additional lubrication and without danger of hot boxes or need of frequent inspection would be a step forward that would be welcomed by all. Despite the attractiveness of the proposition, and the fact that roller bearings have been successfully applied in many other fields, railroad men have fought shy of the innovation. Possibly this is because of a knowledge that several designs have been offered to them which looked well and did work well for a time, but eventually gave considerable trouble after sufficient time had elapsed to allow the results of fatigue to become manifest. The perfecting of a design of roller bearings for car trucks is bound to take some time, but little will be accomplished until the railroads attack the problem seriously and are willing to carry on a considerable number of tests for developmental purposes.

**Forging Machines Demonstrate Value**

It may be true that, owing to the extremely rapid spread of autogenous welding, much of the work formerly sent to the railroad blacksmith shop now never leaves the erecting shop. Granting that this loss of work has a tendency to lessen the importance of the blacksmith shop, this department has more than held its own on a production basis because of the machine and drop forging work. Many locomotive and car parts are made at a minimum cost by the use of production forging machines, an interesting example of these operations being described in the December, 1921, *Railway Mechanical Engineer*. This article told of the machine forging work at the Elizabethport

shops of the Central Railroad of New Jersey, but the work is typical of that carried on at many other points. Bolts are made in great numbers and all sizes on forging machines. Truck cross-ties, draft sills, reinforcement channels, drawbar yokes, air brake levers and hundreds of small parts for use on locomotives and cars are produced in quantity by efficient forging machines. The quality of the work is excellent and its cost compares favorably with that of other methods of manufacture. The field for drop forging work also is very large and one which has not been developed as fully as it should in railroad shops. It is essential in all this work that dies be properly designed and carefully heat treated. Railroad men responsible for the design of these dies are to be congratulated on the mechanical ingenuity and knowledge of the flow metal under pressure which is often displayed. The reduced labor cost due to manufacturing more or less complicated parts at a single stroke of the hammer is self-evident and this work should be extended.

**Penalty Prices in the Rules**

There is probably no lack of agreement on the proposition that all freight cars should be maintained as defects develop. In fact, this is the purpose of Rule 1 of the interchange code. Likewise, it is unquestionably a fact that foreign cars are quite generally neglected until it becomes necessary to return them home in bad order for heavy repairs. No incentive seems to have been found, however, to make the provisions of Rule 1 more than a pleasing fiction. The Railway Age has advocated the adoption of a schedule of billing prices for labor and material deliberately fixed to include a fair commercial profit from all operations performed under the price rules. This, it is believed, is sound in principle. There is no more reason to expect the railroads, which are essentially private corporations organized for profit, to perform at cost a service involving large expenditures for labor and material and requiring an extensive investment in facilities, than it would be to expect them to perform transportation service on the same basis. One of the objections which has been raised to this suggestion is that it would not prove effective, since the responsibility for financial results and the performance of maintenance operations is so widely seperated. In this connection it is interesting to note in the report of the Committte on Prices for Labor and Material the application of this very principle in the establishment of prices for journal box lids with a differential intended to make the application of the A. R. A. standard lid profitable, and the application of other lids unprofitable. No doubt these are difficulties which would have to be overcome in establishing a set of prices in which a profit is included. But these do not include a lack of effectiveness as an incentive to improve the general standard of car maintenance.

**The Foreman and the Public**

In selecting a foreman or an officer of any railroad it is important to keep in mind not only his qualifications as a leader of the men under him, but also his potential possibilities for making friends for the railroad. Remember that these men, because of their official connection, are looked upon by the public as integral parts of the railroad management. Then, too, the influence that they may have upon the men under them will be reflected as the men themselves deal with the public, of which they form a large part in many communities. It is true that the type of man that will make a good leader will in most cases be one who can make a favorable impression upon the public. He cannot, however, make good in a large way unless he is fully informed as to the spirit of the management and of the facts about the road's operation, financing, etc., which may be misunderstood or misinterpreted by the public. If every railroad foreman and subordinate officer were fully informed as to facts about the railroad and its relations with the public, they could render invaluable service in these troublesome days. It is the force of public opinion, after all, that makes our Congressmen and public servants "toe the mark." Fortunately, or unfortunately, whichever way you may view the matter, public opinion forms and crystallizes slowly; it requires a long, slow and sometimes tedious program of education to change it. It is vital if the railroads are to prosper—and the prosperity of the entire country depends upon them—that railroad foremen, dealing as they do with the men in the ranks and holding responsible positions in the eyes of the public, should be selected and trained to interpret the spirit of the railroad and present the facts concerning it to the workmen and the public.

**Spotting Power Plant Fuel Wastes**

In any consideration of plans for conserving fuel it should not be forgotten that railway power plants, numbering over 1200 in the United States, are large fuel consumers. Do power plant engineers and higher mechanical officers give these plants the continuous attention without which economy in fuel consumption will never be secured? It has been estimated that the average power plant wastes 25 per cent of its fuel in preventable heat losses while burning and these losses will never stop by themselves. They will never stop until some one in authority develops a definite plan for locating the losses, stopping them and keeping them stopped. A method of accomplishing these three objectives is outlined by Joseph W. Hays in an intensely practical little book entitled, "How to Build Up Furnace Efficiency," which passed through its tenth edition in 1916. Mr. Hays states that the only equipment necessary for "spotting" fuel wastes consists of some tallow candles, a flue gas analyzer, a sensitive differential draft gage and high temperature themometer or pyrometer. With the idea of checking up fuel wastes the following questions are put directly up to each power plant engineer.

"What is the efficiency of your boiler furnaces? What draft in your boiler furnaces will carry your load and burn the least coal? Have you calibrated your boiler dampers and the main breeching damper? Have you equalized the draft among the boilers? How much air is leaking through your boiler settings? When is an air leak an aid to efficiency? Where are the air leaks that are injuring efficiency? How much too much air are your firemen permitting to flow through the fuel bed? Do your firemen admit more air than is necessary at the furnace either above or below the fire? How much excess air from all sources are you heating and sending up the chimney? How thick should the particular coal you are burning be carried on the particular grates you are using? Are you using the coal best adapted to your conditions? Are you using the grates best adapted to your conditions? Should the coal you are using be fired dry or wet for greatest economy? Is the grate surface just right for the highest economy? How much and what kind of combustible is passing up your chimney? What are the specific causes of the smoke you are making? Is the low evaporation of which you complain due to the boiler, the furnace, the coal or the fireman? If you don't know why the evaporation is low, how will you proceed to increase the evaporation? How much coal is your poor fireman wasting and how much more can your best fireman save? Will you state under oath that the boiler headers are *always* properly packed and the setting and baffling *always* in proper condition before your boilers are put into service?"

A satisfactory answer to these questions will be impossible unless most of the fuel wastes have been "spotted," and if any plant engineer does not know how to answer the questions, he should either resign or take a course in combustion engineering.

## Yesterday's Entertainment

THE ENTERTAINMENT activities of yesterday ended at an early hour this morning. An orchestral concert was given in the ballroom on the pier in the morning, followed by an informal dance in the afternoon and tea at 4:30 o'clock.

At 9:30 in the evening the formal ball of the week was opened. To the music of an enlarged orchestra the grand march, so dear to the hearts of the "old guard" of M. C. B. and M. M. times, commenced. The large floor of the ballroom was completely occupied by the marchers. On all sides in the exhibit booths and in the balconies there were throngs of ladies and gentlemen who did not take part in the march, but who were interested spectators. Dancing followed the grand march and was prolonged to a late, or rather an early hour.

Great credit belongs to the Entertainment Committee Chairman R. J. Himmelright and his co-workers and to the following sub-committee which was in charge last night: C. W. Floyd Coffin, chairman; Lewis O. Cameron, W. G. Cook, J. W. Fogg, G. A. Nicol, Jr., F. W. Venton, W. R. Walsh and W. M. Wilson.

## Chief Interchange Inspectors to Hold Annual Meeting in Chicago

THE CHIEF INTERCHANGE Car Inspectors' & Car Foremen's Association has decided to hold its annual convention in Chicago August 22-24. The hotel in which the meetings will take place has not yet been selected. The subjects to be discussed, in addition to the usual consideration of the rules of interchange and loading rules, include the following: Car department apprenticeship, freight claim prevention, train yard repair conditions and preparing cars for flour loading.

## Enrollment

THE ENROLLMENT booth at the main entrance to the Million Dollar Pier will be open today from 9.00 a. m. to 1.00 p. m.; 2.00 p. m. to 6.00 p. m.; and 7.00 p. m. to 8.00 p. m.

## New President for Standard Coupler Company

COL. DOUGLAS I. MCKAY is attending the convention this year as president of the Standard Coupler Company, having been elected recently to that position. Colonel McKay was born in New York in 1883. After completing a course in the public schools he attended the College of the City of New York for three years and then entered West Point Academy, from which he was graduated with highest honors in 1905. He was commissioned a second lieutenant in the Coast Artillery and was promoted to first lieutenant in 1907. In 1908 he resigned to enter civil life and was appointed deputy chief of state constabulary. After a few months' service in this capacity he was promoted to chief in which position he served for three years.

In 1911 he was appointed first deputy police commissioner of the City of New York, having charge of the business administration of the department and direct command of the uniformed force. In 1913 he was appointed police commissioner. Colonel McKay resigned from the police department in 1914 to become assistant to the president of J. G. White & Co., of which organization he became vice-president in 1915 and a director in 1916.

Shortly after this country entered the war Colonel McKay resigned to enter the army and was commissioned a major in the Ordnance Department. In December, 1917, he was promoted to lieutenant colonel and assigned to the general staff. In March, 1918, he was made a colonel and continued on general staff duty until August, when he was assigned to the position of emergency director of artillery ammunition production. He received his discharge at the end of 1918 and was elected president of the International Pulverized Fuel Corporation and Pulverized Fuel Equipment Corporation. Colonel McKay is a director of the Botany Worsted Mills, the International Agricultural Corporation and the Atlantic Trust Company of Baltimore.

## John Woodrow Marden

JOHN WOODROW MARDEN, for many years superintendent of the car department of the Boston & Maine, died on May 22 at his home in Waltham, Mass., at the age of 82. Mr. Marden entered the employ of the Concord Railroad as a repair man and later went to the Norwich & Worcester as general foreman. He left this position to become master car builder of the Fitchburg Railroad. He later acted for that road in the capacity of superintendent of rolling stock, superintendent of motive power, and superintendent of bridges and buildings. When the Fitchburg Railroad became a part of the Boston & Maine, he was made general foreman of the Fitchburg division and was later promoted to superintendent of the car department, which position he held up to the time of his retirement. Mr. Marden was a past president of the Master Car Builders' Association and also of the New England Railroad Club.

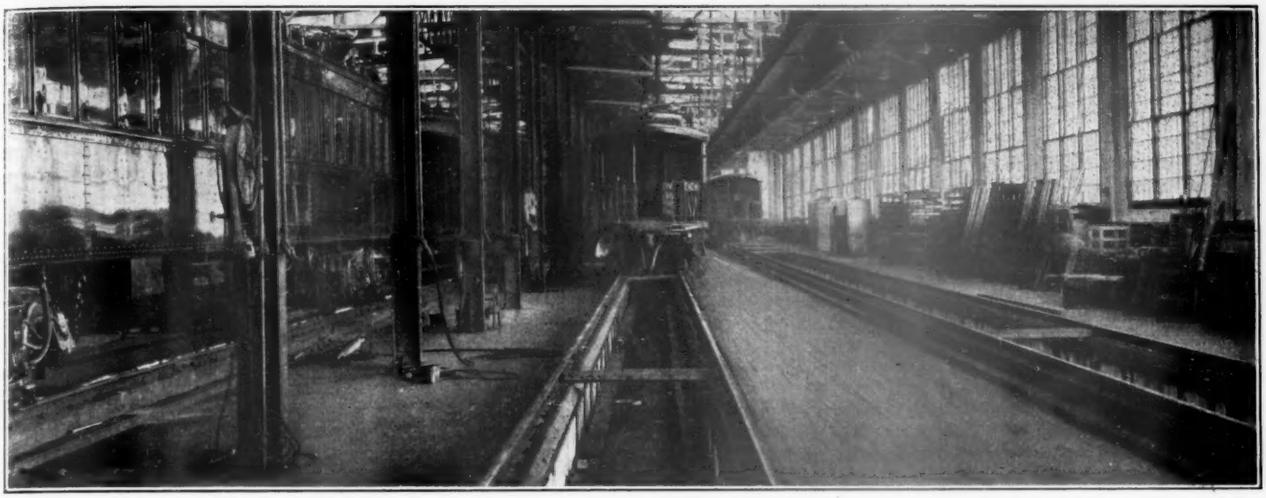
## Train Control Order Reissued

THE INTERSTATE COMMERCE COMMISSION today made public its order to 49 railroads to install automatic train stops or train control devices upon designated portions of their roads comprising at least one full passenger division substantially in the form of the tentative order of January 10, except that the date for filing report and completing the installation is extended six months, so that the installation is required to be completed by January 1, 1925.

The specifications and requirements appear to be substantially as in the tentative order. Each road is required to file with the Commission on or before January 1, 1923, complete plans of its signal systems and the number and types of locomotives on the designated portion of the line, and to proceed without unnecessary delay to select and install the device; also to file by January 1, 1923, and each month thereafter reports of progress made, with reference to preparation for and installation of the device. However, the Pennsylvania, Panhandle, West Jersey & Seashore, Long Island and Norfolk & Western will not be required to file the plans and reports until July 1, 1923, for the installation between Lewistown and Sunbury, Pa.

The Commission's report says it has eliminated the provision in the specifications of the joint committee under which engineman would be permitted, if alert, to forestall the automatic brake application and proceed.

It has decided not to limit the order to roads or portions of roads already equipped with automatic block signals because it has no desire to discourage efforts to control trains automatically without the use of fixed wayside signals.



# American Railway Association—Division V—Mechanical

## Presentation of Five Committee Reports With Discussion Following Each Occupy Busy Session

Chairman Tollerton called the meeting to order at 10 a.m.

## Report on Prices for Labor and Materials

*Aside from reductions in the wheel prices, few revisions in the prices for materials have been made by the committee this year. The labor rates have been reduced 10 cents an hour from the present $1.20 an hour in Rule 101 and $1.45 an hour for tank car repairs in Rule 107.*

*The principal work of the committee has been in revising the time allowance in Rule 107 to compensate for increases in labor efficiency since 1920. These revisions are based on a 20 per cent improvement in output under day-work conditions. The allowances for more than 50 items have been increased, principal among which are 38 items dealing with sill renewals. The committee recommends that no change be made in the time allowances for air brake repairs.*

*Additional allowances of $100 for cast steel wheels and $125 for rolled steel wheels are recommended in the settlement prices for destroyed cars under Rule 112. The committee expects to include further revisions in material prices in the 1922 code, if further price declines take place before the new code becomes effective.*

THE COMMITTEE SUBMITS the following report under Freight Car Rules 101, 107, 111 and 112, and Passenger Car Rules 21 and 22:

The material prices recommended are the same as those reported under Supplement No. 1 of May 1, 1922, with the exception of certain items which have been adjusted due to market conditions. They are based on the average purchase price as reported by seven large roads during January and February, 1922, as well as current quotations of several large railway supply companies. The material prices include transportation charges, direct and indirect storeroom expenses, manufacturing cost wherever involved, and interest on stock investments, which is based on the average monthly inventory balance, multiplied by interest rate and result divided by total annual material disbursements. Scrap credits were based on the average current scrap material prices.

These material prices are recommended with the understanding that if there is any further decline before 1923, same would be adjusted to existing conditions prior to the 1922 rules going into effect.

The present labor allowances were based on time studies conducted during 1915 and 1916, with proper adjustment for decreased productivity of labor on day work basis as compared with piece work basis which existed when the present allowances were established. A recent study conducted on three large roads developed that the time at present required to perform freight car repairs made necessary, due to improved efficiency of labor on day work, the removal of part of the adjustment referred to, in order that the labor allowances might reflect present day work productivity, and the labor allowances that were adjusted in 1920 have been reduced approximately 20 per cent. In recommending these allowances due consideration was given to the fact that the majority of repairs to foreign cars is being done on a day work basis.

The labor rate per hour (Item 175, Rule 101) is recommended at $1.10 per hour, which is based on a study of 20,006 men, being

the weighted average hourly rate paid repairmen on wooden, steel and composite freight train cars by eight large roads, plus the average direct and indirect overhead of 62 per cent as reported by six representative roads.

Preserving the present differential, the labor rates per hour (Items 19 and 20 of Rule 21) are recommended at 85 cents per hour for labor on lubrication and $1.20 per hour for labor repairs to passenger train equipment.

Any reduction in the basic hourly rate before 1923 is to be adjusted before the rules go into effect.

The committee also recommends under Items 458, 459 and 460, Rule 107, a charge for dismantling all-steel constructed cars, which at present is being charged at actual cost. The recommendations are the average results based on the study of 123 cars submitted by three large roads, and covers all necessary cost of cutting, handling, sorting and weighing the scrap.

The present charges under Rule 111 are to remain, as the reductions are very slight and the committee felt that no reduction ought to be made at the present time.

The pound prices for cars in Rule 112 is based upon statistics furnished by the President's Conference Committee. With the rapidly declining market, your committee, in the absence of complete figures from the President's Conference Committee on new car costs for the full year of 1921, made an arbitrary reduction of 30 per cent, effective from May 1, 1922, which was covered by Supplement No. 1, dated May 1, 1922. Any further reductions before the 1922 rules go into effect, obtained either from the market conditions or through the obtaining of complete data from the President's Conference Committee on the 1921 cost of new equipment, will be adjusted and included in the 1922 rules, which go into effect as of January 1, 1923.

An additional allowance of $100.00 for cars equipped with cast steel wheels, and $125.00 for cars equipped with rolled steel wheels, is recommended under Rule 112, which represents the difference in value over the cast iron wheels, due consideration being given the lower scrap credits for these kind of wheels.

[The committee also proposed changes in the scrap and service metal charges for new wrought steel wheels, Rule 98, as follows: Scrap value for metal inside the condemning limit reduced from $5.55 to $1.90; service metal value reduced from $2.21 for each 1-16 inch to $1.52. The labor charge of 1.8 hours allowed for restoring the standard contour is also reduced to 1.4 hours in question No. 3 under the interpretation of this rule. The revisions in material prices in Rules 101 and 22 were almost entirely confined to wheels. Items 190, 190-A and 190-B, Rule 101, covering charges for stenciling, have been transposed to Rule 107, Items 376, 376-A and 376-B.—EDITOR.]

The report is signed by A. E. Calkins (chairman), N. Y. C.; Ira Everett, Lehigh Valley; J. H. Milton, C. R. I. & P.; C. N. Swanson, A. T. & S. F.; T. J. Boring, Penn. System; E. H. Weigman, L. & N.; I. N. Clark, Grand Trunk; H. G. Griffin, Morris & Co., and A. E. Smith, Union Tank Car Co.

## Discussion

A. E. Calkins (N. Y. C.): Under Rule 98 you will see it is practically a repetition of last year's rule except that we have adjusted the prices so as to hit the present cost price of wrought steel wheels on account of the lowering cost of those wheels. Rule 107, as you see, sets forth the labor charge as $1.10 per hour for freight cars, and $1.35 per hour for tank cars, (Item 443). The notes on Rule 21 I have already mentioned in the summary of the report.

C. E. Fuller: (U. P.) I do not think there is any subject before this convention that is as important as the Price Committee Report. It is dollars and cents for all of us. There is more or less criticism during the year relative to prices. The question of repairing foreign cars and being able to get out even is discussed, and I hate to see this convention close this report without having some of the men who are repairing cars tell us something about it. We cannot hope to get 100 per cent, but we can get nearer 100 per cent if we get the expression of the men who are doing this work.

It is my feeling that car men themselves are the ones who should give us the information, men who are right on the ground floor and doing the work, and while I do not see anything about this report that I can criticise, I am sure there are gentlemen here who will criticise it and have criticised it, and now is the time to do it. Let us all get some light on the subject.

Mr. Calkins: I think with all the inquiries we will undoubtedly get during the year there ought to be some questions today. I know that our dockets every meeting are pretty well loaded with inquiries as to how to apply these prices. It would be of help to the committee to hear some expressions today.

T. H. Goodnow (C. & N. W.): I would like to ask the chairman of the committee why there is a special allowance for steel wheels. Is not that covered in the committee's costs, the same as other specialties on cars? That is referred to on the last page where you make a special allowance for settlement price for cars equipped with steel wheels. Do not you set these figures up the same as the other materials used on the cars?

Mr. Calkins: The reproduction costs for new cars is taken from the President's Conference Committee on the basis of cast iron wheels. The prices are based all the way through on a plain car with certain allowances for the specialties, but the only specialty which was recommended by the President's Conference Committee was the wrought steel and cast steel wheel.

Mr. Goodnow: Why do you recognize that and no other special features?

Mr. Calkins: Because it was referred to us by the President's Conference Committee.

Mr. Goodnow: The car with steel wheels is being specially favored apparently. There are lots of items on cars that cost about the same that should have been brought to the attention of the committee, if it was known that we were going to set up individual prices.

Mr. Calkins: Take the item of roofs. You have the base price on the ordinary car roof and the other types of roof are rated accordingly.

Mr. Goodnow: These arbitrary figures in the settlement of cars, with reference to special items on the car, are going to draw in other things on the car. I think if you are going to establish that principle, you must go further and make it apply to everything of a special character on the car.

Secretary Hawthorne: When the Depreciation Committee's report was presented they included wrought steel wheels as a special addition to the destroyed car settlement. When that report was presented on the floor, Mr. Giles offered a resolution that the cast steel wheels should be given consideration. That resolution was approved by this body at that convention and acted on by the Price Committee, but the rules have not been printed containing that feature.

F. W. Brazier (N. Y. C.): This committee, if you notice, is made up of representatives of railroads located in the north, south, east and western sections of the United States and Canada. They have gone into this work very carefully and the work which they undertook to do is very trying and difficult. I want to compliment the committee for the hard work done. It is easy for men to come to the conventions who are not on the committee and read the report and get some of the benefits of the information contained. They do not necessarily have any appreciation of what is involved in the preparation of the report, however.

J. E. Mehan (C. M. & St. P.): I have been looking through the report to see if there is anything inserted in the report covering the reproduction cost. For instance, in the case of a tank car made by the tank car builders, there is included in the reproduction cost the freight charges for getting the tank to the owners. We have had cases where the car owner in setting up his cost has

added to the cost the freight charges of getting the tank to the manufacturing plant empty. Then they have added that freight charge to this reproduction cost. I was trying to find something that referred to this freight charge, and was wondering if that point had been covered definitely.

Mr. Calkins: I do not think that point is covered.

Mr. Meehan: I think it should be settled definitely as that point does come up. They claim that their books show a charge for the shipment of the car and that they should be compensated for this charge. I think while the report is before us something definite should be put in so we will know just where we are.

E. Miller (B. & M.): I have been looking through the report and fail to find any reference to the cast steel wheel, what is known as the one-wear wheel. Has the committee given that any attention?

Mr. Calkins: In the case of cast steel wheels, in the settlement for the car, we have an additional allowance of $100 for cars equipped with cast steel wheels. Cast steel and wrought steel are both recognized in reproduction costs.

As to the point Mr. Meehan brings up, that can be covered. The rule does not say you can include the freight charge, neither does it say that it is prohibited. That point can be covered in the rules later.

There is one point which the committee would like to bring to your attention and that is that the committee desires to get information from all sections of the country, and when our sub-committee sends out inquiries for information for the use of the committee, it is difficult many times to get a sufficient number of answers to our inquiries, which will make the information presented in our reports as full as we desire to have it. I think that the members of the association should take individual interest in keeping their records so that they can give the members of the committee the benefit of their prices, the labor conditions, or whatever we are asking for. In this way we may obtain truly representative figures instead of having the information which we present confined to a large degree to the roads represented on our committee.

Secretary Hawthorne: Referring to Mr. Meehan's question, that subject was considered by both the Arbitration Committee and the Price Committee at different times and the queries of members in those respects were answered during the year. The answer included the prices set by the arbitrary settlement figures, giving the additional allowance which would be applicable in the case of cars new from the plant to the car owner.

Mr. Meehan: Was that ruling sent out universally?

Secretary Hawthorne: Not in any printed statement, but the information was given to the people who raised the question.

Mr. Meehan: That is the point. It only goes to certain people, but it should be put in the rules so that everybody would know what the situation is in that respect.

R. L. Kleine (Pennsylvania): I feel like Mr. Brazier that this committee has done its work so well, and as the prices set forth are average prices covering the returns from a large number of roads, there is little to discuss. They have also shown how they arrived at these prices. I therefore move that the report of the committee be accepted, and the amendment made to the rule.

(The motion was seconded.)

C. J. Wymer (C. & E. I.) I would just like to say a word in regard to this decision. We have had a number of cases reported to us by railroads in controversies giving us a decision from the Arbitration Committee that we knew nothing about, and we have to write the Arbitration Committee to find if such a decision had been made. They had not been universally sent out. It seems to me when a decision is made the roads ought to be notified. We had a number of decisions quoted to us of which we knew absolutely nothing until we took it up to find out if such a decision had been made.

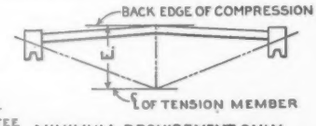
Chairman Hawthorne: Mr. Wymer, your question is covered in the report of the Arbitration Committee as you will see when that report is brought up. Before calling for the question, I would like to ask Harry Griffin if he won't say a few words relative to the prices of labor and material as applied to private cars. Mr. Griffin, won't you come forward and say how this committee's report applies to you?

H. G. Griffin (Morris & Co.): Under the present system of making these prices, you can ask for an analysis of any price and we can tell you pretty well what it is. I do not think there is anything that we could criticise in the report.

G. W. Rink (C. of N. J.): I would like the committee to explain what they had in mind in connection with Item 104, Rule 101, which involves a charge of 25 cents.

**IDENTIFICATION TABLE FOR A.R.A. TRUSSED TYPE BRAKE BEAMS**

ANY BEAM WITH A SINGLE DIMENSION OR REQUIREMENT LESS THAN THAT SHOWN SHALL BE CLASSED EITHER NON A.R.A. OR ONE CLASS LOWER AS CASE MAY BE




COMPILED BY A.R.A. BRAKE BEAM COMMITTEE 1922

MINIMUM REQUIREMENT ONLY

| A.R.A. CLASS. | | No. 1. | No. 2 | No. 2+ | No. 3. | A.R.A. CLASS. | | No. 1 | No. 2. | No. 2+ | No. 3. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CAPACITY. | | 65000 | 120000 | 150000 | 180000 | CAPACITY. | | 65000 | 120000 | 150000 | 180000 |
| | A | 2 1/8" | 2 3/8" | 2 3/8" | 2 3/8" | | A | | 3" | 3" | 3" |
| | B | 2 1/16" | 2 3/16" | 2 3/16" | 2 3/16" | | B | | 1 11/16" | 1 11/16" | 1 11/16" |
| | C | 7/32" | 5/16" | 3/8" | 3/8" | | C | | 3/8" | 3/8" 1/2" | 1/2" |
| | D | 1" | 1 1/8" | 1 1/4" | 1 3/8" | | D | | 1 1/8" | 1 1/8" 1 1/4" | 1 1/4" |
| | E | 12" | 13" | 13" | 14" 15" | | E | | 14 1/16" | 15" 14 1/2" | 15 1/16" |
| | | | | | | | F | | 5/16" | 5/16" 5/16" | 3/8" |
| | A | 2 3/8" | 2 7/8" | 2 7/8" | | | A | | 2 3/4" | 2 3/4" | 3 1/2" |
| | B | 2 1/16" | 2 1/2" | 2 1/2" | | | B | | 2 3/4" | 2 3/4" | 3 1/2" |
| | C | 5/32" | 3/16" | 3/16" | | | C | | 3/8" | 3/8" | 1/2" |
| | D | 1" | 1 1/8" | 1 1/4" | | | D | | 1 1/8" | 1 1/4" | 1 3/8" |
| | E | 12" | 13" | 13" | 14" | | E | | 13 7/8" | 15 5/16" | 15 5/16" |
| | A | 3" | 3" | 3" | 3" | | A | 2 1/4" | 2 3/4" | 2 3/4" | 3 1/2" |
| | B | 1 13/16" | 1 13/16" | 1 7/8" | 1 15/16" | | B | 2 1/4" | 2 3/4" | 2 3/4" | 3 1/2" |
| | C | 3/16" | 3/16" 1/4" | 1/4" | 1/4" | | C | 1/4" | 3/8" | 3/8" | 1/2" |
| | D | 1" | 1 1/8" | 1 1/4" | 1 3/8" | | D | 1 3/4" | 2" | 2" | 2 1/2" |
| | E | 12" | 13" | 13" | 14" 15" | | E | 14" | 17" | 17" | 17 1/4" |
| | | | | | | | F | 1 3/4" | 2" | 2" | 2 1/2" |
| | | | | | | | G | 1/4" | 5/16" | 5/16" | 3/8" |
| | A | 3" | 3" | 3" | 3" | | A | 2 1/8" | 2 1/8" | | |
| | B | 1 1/2" | 1 1/2" | 1 1/2" | 1 7/8" | | B | 2 1/8" | 2 1/8" | | |
| | C | 3/16" | 7/32" | 1/4" | 1/4" | | C | 1/4" | 9/32" | | |
| | D | 3 3/8" 2 x 7/16" | 2 1/2" | 2 5/8" | 2 5/8" | | D | 1" | 1 1/8" | | |
| | E | 12" | 14" | 14" | 15" | | E | 13" | 15" | | |
| | A | 2" | 2 1/2" | | | | A | 2 1/2" | 2 1/2" | 2 1/2" | 2 1/2" |
| | B | 1 1/2" | 1 1/2" | | | | B | 2 1/2" | 2 1/2" | 2 1/2" | 2 1/2" |
| | C | 7/32" | 7/32" | | | | C | 3/16" | 3/16" | 3/16" | 3/16" |
| | D | 2 1/2" | 2 5/8" 2 1/2" | | | | D | 1" | 1 1/8" | 1 1/4" | 1 3/8" |
| | E | 12" | 13 1/2" | | | | E | 12" | 13 1/2" | 15" | 15" |
| | | | | | | | F | 5/16" | 5/16" | 5/16" | 5/16" |

**Proposed Form of Table to Replace Present Table in Rule 101 (Page 115, 1921 Rules)**

*(Referred to in Text on Page 1440.)*

There is a note underneath that item which states: "This charge was reduced to encourage the use of the A. R. A. standard specification lid as per item 104-A." I cannot just place the lid, but we probably would not consider it as an A. R. A. lid.

Mr. Calkins: That is what we among ourselves term a penalty price for not using the A. R. A. standard lid which is covered by a specification standard journal box lid to discourage the use of the standard journal box cover, or any lid that does not meet the specifications.

*(The motion to accept the report was put to a vote and carried.)*

# Report of the Arbitration Committee

*It is doubtful if any committee of the Mechanical Division has as many and as exacting duties to perform as the Arbitration Committee. The burden of answering questions or interpreting the rules informally has been heavy and the committee will no longer render decisions except on those questions or controversies which are submitted formally according to the procedure outlined in Rule 123.*

*Another duty of the committee involving a large amount of work is the passing on the mass of suggestions for changes in the rules, originating with railroad clubs, foremen's associations and others, all of which must be carefully weighed by the committee before its recommendations to the Mechanical Division can be formulated. The interests of the railroads are so universally affected by the application of these rules that ill-advised changes would soon lead to chaos in their interchange relations, and a heavy responsibility rests on this committee which, in effect if not technically, determines what modifications shall be made from year to year. One of the significant changes this year is the reintroduction of combination defects under delivering company responsibility in Rule 32. The last of the combinations formerly appearing in Rules 37 to 42 inclusive, disappeared from the Rules in 1918.*

DURING THE YEAR Cases 1184 to 1232 inclusive, have been decided and copies sent to the members. A copy of these decisions is made part of this report. A vote of concurrence in the decisions is respectfully requested by the Committee.

With the approval of the General Committee, your committee has continued the rendering of interpretations of such questions as have been asked by the members regarding the Rules of Interchange. The more important of these interpretations have been issued to the members in Supplement No. 1 to the 1921 Rules of Interchange,

Under date of September 8, 1919, the Arbitration Committee issued Circular No. 60 outlining certain requirements to be followed in presenting questions for interpretation in connection with the Rules of Interchange, as well as regular arbitration cases for decision. In many cases there has been more or less disregard of the instructions referred to. The situation has become so burdensome that the committee considers it necessary to discontinue the practice of furnishing direct interpretations. Therefore, in the future, questions or controversies arising under the Interchange Rules on which a decision is desired should be regularly submitted in the form prescribed in Rule 123.

All recommendations for changes in the Rules of Interchange submitted by members, railroad clubs, private car owners, etc., have been carefully considered by the committee and, where approved, changes have been recommended.

## Recommended Changes in the Rules of Interchange

As far as possible the changes and additions in the text of the rules are shown in italics.

RULE 2

In order to eliminate conflict between Car Service Rules and Interchange Rule 2 it is recommended that the second paragraph and sections (i) and (j) of this rule be modified in accordance with proposed form shown below:

"Second Paragraph—Empty cars offered in interchange must be accepted if in safe *condition and serviceable for same commodity that can be loaded in the car, the receiving road to be the judge.*

"Owners must receive their own cars, when offered home for repairs, at any point on their line, subject to the provisions of these rules.

*Empty cars furnished on orders for specific lading must be in serviceable condition for such lading, the receiving road to be the judge."*

*"Section (i)—A bad order foreign car delivered under load, if load is transferred or unloaded within switching district, may be returned to delivering line properly side-carded on both sides with a bad order transfer, or return when empty card, showing the defects for which the car was transferred or returned, in which case it must be accepted unless the receiving line has a direct physical connection with the car owner at that point or where delivery can be made to the car owner at that point through an intermediate switching line, car ferry or float."*

Section (j)—Eliminated.

RULE 3

The use of coupler yokes with pull depending entirely on the rivets should be prohibited and the committee recommends that a new paragraph be added to Section (b) as follows:

*"After January 1, 1924, cars equipped with couplers having riveted yoke without lugs will not be accepted in interchange."*

The committee recommends that Section (c), second paragraph, be modified to read in accordance with proposed form shown below; to permit the use of No. 2 or No. 2 plus beam as recommended by the Committees on Brake Shoe and Brake Beam Equipment, Train Brake and Signal Equipment and Car Construction; also in connection with changes recommended in Rule 17, Section (e):

"Section (c) second paragraph.—Cars built after January 1, 1917, or cars receiving general repairs after October 1, 1918, must be equipped with metal brake beams of not less than the capacity of the No. 2 A.R.A., *brake beam."*

The committee recommends that the effective date of Section (d) second paragraph, be extended to January 1, 1924. The present situation justifies this extension.

The committee recommends that Section (f) be modified to read in accordance with proposed form shown below, the effective date being extended to January 1, 1923:

"Section (f).—After *January* 1, 1923, *no refrigerator car* equipped with brine tanks will be accepted in interchange unless provided with suitable device for retaining the brine between icing stations."

The committee recommends that the effective date of Section (g) be extended to January 1, 1923 and the section modified in accordance with proposed form shown below:

"(g) After *January 1, 1923,* cars will not be accepted *from owners* unless stenciled showing month and year built, or bearing a badge plate giving this information. Cars built prior to 1895 may be stenciled "Built prior to 1895" or bear a badge plate giving this information." (Reference to tank cars eliminated.)

The committee recommends that the effective date of Section (h) be extended to January 1, 1923, and the section modified in accordance with proposed form shown below:

"(h) After *January 1, 1923, cars will not be accepted from owners* unless the body is stenciled light weight and capacity in pounds as provided for in Rule 86. Tank cars shall be weighed and stenciled by the tank car companies only, or by authorized representatives of the tank companies."

The committee recommends that Section (j) be modified to read in accordance with proposed form shown below:

"Section (j) Refrigerator cars not equipped with door hooks and fasteners *or other efficient device* to secure the doors in an open position will not be accepted in interchange."

It is felt that the use of any efficient device for this purpose should be permitted.

The committee recommends that the time limit in the second sentence of Section (1) be extended to January 1, 1924. It is considered advisable to allow additional time in which to comply with this requirement.

The committee recommends that the answer in interpretation of No. 4 be modified in accordance with proposed form shown below:

"A.—If a tank car is equipped with safety valves, the valves must be tested and the record of the test stenciled on the tank, as required by the Tank Car Specifications, regardless of the commodity carried. *Test of safety valves is required at intervals as follows:*

| | lb. per sq. in. | Time limit for test |
|---|---|---|
| Class I | 12 and 25 | 2 years |
| Class II | 12 and 25 | 2 years |
| Class III | 25 | 2 years |
| Class IV | 25 | 6 months |
| Class V | 200 | 2 years |

RULE 4

The committee recommends that the second paragraph of this rule be modified in accordance with proposed form shown below. It is felt that the rewording of this rule will bring about the desired improvement in avoiding the issuance of unnecessary defect cards.

"Defect cards shall not be required for any *slight damage (new or old), that of itself does not require repairs before reloading of car. Defect card shall not be required for raked or cornered sheathing, roof boards, fascia, bent or cornered end sills, if defects are old.*"

RULE 9

The committee recommends that the item showing information required on billing repair card under the heading "Air Brakes Cleaned" be modified in accordance with proposed form shown below:

*"R&R K-1 or K-2, convertible or non-convertible.*

"Name of road and date of last previous cleaning.

"Work performed, per Rule 60."

The committee recommends that a new item be added under the heading of "General Information," to be shown on billing repair card as follows:

"Size of Bolts and Nuts"

This will make it possible to check the weight of such material.

The committee recommends the following interpretation of this rule:

*"Q.—Is it necessary to specify dimensions of forgings and springs on billing repair card in addition to weight?*

*"A.—No."*

This interpretation seems necessary on account of certain railroads insisting that this information be furnished although not specified in the Rules.

RULE 12

The committee recommends that the following be added as the second paragraph of Rule 12:

*"At points where it is impracticable for a railroad company to obtain joint evidence, the evidence of car owner shall be sufficient provided it is furnished by a competent representative of the railroad company after actual inspection has been made by him."*

The car owner should be afforded the means of establishing the existence of wrong repairs in the many instances when it is impracticable to secure joint evidence.

RULE 17

To permit the use of No. 2 or No. 2 plus brake beams as recommended by the Committees on Brake Shoe & Brake Beam Equipment, Train Brake & Signal Equipment and Car Construction, the committee recommends that Section (e) of this Rule be modified in accordance with proposed form shown below:

"(e) A. R. A. No. 2 *or A. R. A. No. 2 plus* brake beams may be used in repairs to all freight equipment cars equipped with non-A. R. A., A. R. A. No. 1, A. R. A. No. 2 or *A. R. A. No. 2 plus* brake beams, *charges and credits to be on basis of beams applied and removed. A. R. A. No. 3 brake beam must be replaced in kind.*"

The committee recommends that Interpretation No. 11 of Rule 17 be modified to read in accordance with the proposed form shown below:

"Q.—Owing to the great demand for equipment, it has become necessary in a number of cases to repair truck bolsters *and pressed steel side frames* by riveting patches, which makes a reasonably substantial job. Is it proper to bill car owner for this work?

"A.—The patching of bolsters *and truck side frames* generally is not considered good practice. However, in the case of pressed or structural steel bolsters *and pressed or structural steel side frames,* patching of flat surfaces or tension side by riveting on plates, in a substantial manner, is permissible, and may be considered permanent repairs, *provided this patching restores original strength of bolster or side frame.*"

In order to clarify the matter of exchanges of various types of triple values the committee recommends the following interpretations to be added to this rule:

"Q.—What types of triple valves are standard? What types convertible and what types non-convertible?

"A.—The only A. R. A. standard triple valves are the K-1 and K-2.

"The only triple valves that are convertible to the "K" type are those having removable check valve case.

"Triple valves having check valve case cast integral with triple valve body and not removable are non-convertible to the "K" type.

"Q.—Is is considered wrong repairs, to substitute one type of non-convertible triple valve for another non-convertible type?

"A.—No. Provided car was built prior to January 1, 1919, and is stenciled showing a non-convertible type valve as standard or where car is not stenciled showing what type of valve is standard. Cars built after January 1, 1919, must have "K" type of triple valve applied."

RULE 32

The suggestion to include in Item 1, discharge valve caps missing from tank cars, as delivering line responsibility, was not approved. These caps may and do work out of position and lose from cars in fair service.

The committee recommends that the following combination of defects denoting unfair usage be added to this rule immediately following the present first paragraph:

*"Delivering company will be responsible for damage to car when the following combinations of sill damage exist, regardless of cause or physical condition of sills.*

*"Wooden Underframe.—Six or more longitudinal sills broken.*

*"Composite Underframe.—Two continuous metal center sills, broken or bent, together with three or more other longitudinal sills, broken or bent, when necessary to straighten, splice or renew.*

*"All-Steel Underframe.—Four metal longitudinal sills, broken or bent, when necessary to straighten, splice or renew.*

*"Tank Cars with Two Metal Longitudinal Sills only.—Two continuous metal longitudinal sills, broken or bent, when necessary to straighten, splice or renew; provided such damage is accompanied by the shearing of all tank anchor rivets or bolts.*

*"Note—A sill is regarded as "broken" when necessary to splice or renew, even though breakage was due to decay, elongated bolt holes, or other old defects.*

*"Note—A sill is only regarded as "bent" when necessary to remove from car to straighten.*

*"Note—Shearing of all tank anchor rivets or bolts means the "shearing" of either those securing the anchorage to the underframe or tank to the anchorage or both."*

The committee recommends that present Section (d) of this rule be eliminatd in view of above recommendation for combinations of defects denoting unfair usage.

The committee recommends that a new item, to be designated as item (o), be added to the causes of damage denoting unfair usage as follows:

"(o) Telescoping superstructure above the sills due to mounting of adjacent car."

The committee recommends that the last paragraph of Rule 32 be revised to read in accordance with proposed form shown below:

"Defect cards shall not be required for any slight damage (*new or old*) *that of itself does not require repairs before reloading of car. In no case shall defect card be required for raked or*

*cornered sheathing roof boards, fascia, bent or cornered end sills, if defects are old."*

The committee recommends the elimination of present Interpretation No. 7 and the modification of present Interpretation No. 4 to read as follows:

"Q.—Does the damage to a car under any of the conditions enumerated in this rule carry with it the same responsibility for damage occuring to other cars in the same train or draft?

"A.—Derailment is the only cause for which the same responsibility applies to any damage sustained to other cars at same time in same train or draft, except as otherwise provided in Rule 33."

RULE 33

The committee recommends the addition of the following paragraph to this rule:

*"Where running boards on tank cars are spliced, the joint must be located over the running board support and a steel plate of not less than 3/16 in. by 8 in. by 10 in. must be either riveted or bolted to the running board support, and the running board secured by not less than four bolts."*

RULE 43

The committee recommends the elimination of the present notes under this rule account of the recommendation for combinations denoting unfair usage under Rule 32.

RULE 58

The committee recommends that the words "Cars offered in interchange with" in the first line of this rule be eliminated from the rule. As these parts are frequently reclaimed for further use, they should be replaced at the expense of the handling line.

RULE 59

The committee recommends that the words "Cars offered in interchange with" in the first line of this rule be eliminated from this rule. As these items are frequently reclaimed for further use, they should be replaced at the expense of the handling line.

The committee recommends the addition of a new paragraph to this rule, under the bracket "Delivering company responsible," as follows:

*"Missing steam heat hose or air signal hose, complete, where cars are stenciled that they are so equipped."*

It was felt that the car owner should be protected for such missing hose when car is so stenciled.

RULE 60

To insure a higher maintenance standard for retaining valves, dirt collectors and pipe strainers, the committee recommends the addition of the following new paragraphs to this rule, to follow the present first paragraph and read as follows:

*"Charge is not permissible for cleaning triple valve or cylinder unless the triple valve, cylinder, retaining valve, dirt collector (or pipe strainer) are all cleaned at same time.*

*"If either the retaining valve or dirt collector (or pipe strainer) are cleaned, charge may be made therefor even though cylinder and triple valve are not cleaned at same time. The cleaning of these items must be shown separately and bill rendered in accordance with Rule 111."*

RULE 70

The committee recommends that the following note be added to this rule:

*"Note.—Defect cards should be attached to car at time and place wrong wheels are applied. Failure to do this obligates the road delivering car in interchange to issue its defect card. Before rendering bill on authority of such defect card, however, the car owners must investigate their records to ascertain if possible the road on which wrong wheels were applied. If by such investigation the owner fails to locate application, a statement to that effect must accompany bill on the defect card. In the event the application is located by car owner, settlement must be made by the road responsible, in which case the defect card issued under Rule 70 must be canceled. Subsequent receipt of repair card by owner after bill has been rendered on authority of defect card carries the same obligation."*

Car owners should be protected as far as possible against the substitution of cast iron wheels for wrought steel or cast steel wheels, and the penalty should be assessed wherever possible against the line making wrong repairs instead of against delivering line.

RULE 86

The committee recommends that the effective dates of the third and fourth paragraphs of Section (b) of Rule 86 be extended to January 1, 1924. Account of the large number of these axles in service, it is felt that more time should be allowed to effect their retirement.

The committee recommends that the third paragraph of Section (b), Rule 86, be modified in accordance with proposed form shown below:

"Non-American Railway Association Standard axles may be used to replace non-American Railway Association Standard axles in kind until *January 1, 1924*, subject to condemning limits of such axles, *except that non-American Railway Association Standard axles must not be applied to tank cars of private ownership."*

As tank cars are built to comply with the Specifications of the A. R. A., which provide for the use of standard axles, it was felt that such cars should be protected againt the substitution of non-A. R. A. axles.

RULE 88

The committee recommends the following addition to the first paragraph of this rule:

*"Except that when the following substitutions are made, defect cards must be issued for material and labor of correcting, regardless of responsibility for the repairs: Wrong truck side; arch bars in place of truck sides; wooden draft timbers in place of metal draft arms extending beyond bolster; wooden roof in place of metal roof; wooden end in place of all-steel end on house cars."*

The owners should have full protection against improper repairs of the items specified.

RULE 91

The committee recommends that (b) and (c) under the note in Rule 91 be modified in accordance with the proposed form shown below:

"(b) No bills should be returned for correction on account of incorrect car numbers, but shall be passed for payment at once and the alleged errors in car numbers brought to the attention of the company rendering same within 60 days from date bill is passed for payment, *but in no case exceeding six months after first receipt of bill.*

"The billing company shall furnish correct car reference, or shall issue within 30 days countercharge authority as per form shown on page 176. *If it is alleged car was not on repairing road on date claimed, the car owner must show location of car on such date.*

"(c) No bills shall be returned for collection on account of other error or questionable charges unless the net amount involved exceeds 10 per cent of the total amount of the bill, but shall be passed for payment at once and the alleged error brought to the attention of the billing company within 60 days from date bill is passed for payment, *but in no case exceeding six months after first receipt of bill.* The billing road must furnish proper explanation or shall issue within 30 days countercharge authority on form shown on page 176. *If objections to bill does not amount to 25 cents in aggregate, no exception shall be taken, but bill shall be passed for payment as rendered."*

There should be a time limit on exceptions on car repair bills where there has been an unusual delay in payment of same.

RULE 101

It is recommended that the words "Special Section" be inserted in the identification table for solid brake beams in connection with the 17 lb. per ft. channel, in order to clear up apparent inconsistency in the table.

It is recommended that the table shown be substituted for the present identification table for trussed brake beams. It is felt by the Committee on Brake Shoe and Brake Beam Equipment that showing the depth of truss will make the table in question less confusing to inspectors.

*(See Illustration of table on page 1437.)*

RULE 112

The committee recommends the following interpretation of this rule:

*"Q.—From what date shall depreciation be figured in the case of a tank car where the underframe and tanks were built new on different dates?*

*"A.—In cases of tank cars with underframes and tanks constructed on different dates, the oldest date built on the car, whether tank or underframe, shall be the basis of settlement for figuring the depreciation."*

The committee considered carefully recommendations to restore separate settlement for rebuilt cars under this rule, but decided that no change should be made at this time. The persons

making these suggestions are referred to the reasons shown in report for 1921.

PASSENGER CAR RULE 18

The committee recommends the elimination of reference to Freight Car Rule 32, Section 4, because of the modifications recommended in Freight Car Rule 32.

The committee recommends that Rule 18 be modified in accordance with proposed form shown below:

"Settlement for passenger equipment cars destroyed shall be based on cost of reproduction in kind at date of destruction. Depreciation shall be figured at 3 per cent per annum from the date originally built (straight depreciation basis), not to exceed 30 per cent of reproduction cost."

This change is recommended because the present rules do not fully reimburse car owner for car destroyed and in order to bring method of settlement in line with the freight car rules.

The report is signed by T. H. Goodnow (chairman), C. & N.; J. J. Hennessey, C. M. & St. P.; J. Coleman, Grand Trunk; F. W. Brazier, N. Y. C.; T. W. Demarest, Penna. System, and G. F. Laughlin, Armour Car Lines.

### Discussion

Mr. Goodnow: There is shown an analysis of the various changes in the rules that have been recommended for adoption on your part and the issuance of the rules for the ensuing year. The Arbitration Committee held a meeting yesterday afternoon to give all an opportunity to express themselves on these changes and it is to be assumed that any questions that might arise in connection with them were fully presented at that time. As a result of the evident divided opinion regarding responsibility for damage to cars, as covered by Rule 32, the Arbitration Committee in executive session following the open meeting, considered it best to recognize that, and to withdraw its recommendation under Rule 32—that portion of which refers to the setting up of the combinations. So that in acting on the Arbitration Committee's report, it will be understood that the Arbitration Committee has withdrawn that portion of its report, at least for the ensuing year, and will continue present Rule 32 so far as that portion of the rule is covered. It can be understood that the further recommendations in connection with Rule 32 are still a part of the Committee's recommendation to be acted upon at this time.

Similar action, of course, will follow on the passenger car rule. That portion of the rule which refers to action on this rule, the same as the change in Rule 32, will be withdrawn on account of withdrawing the recommendation for the freight car rule. The other rules that were questioned, or as to which suggestions were made at yesterday's meeting, were fully considered by the committee and the committee continues the recommendation as made in the report. The only change that they make is the one that I have referred to in Rule 32.

Mr. Calkins: Do I understand with the change in Rule 32 the committee withdraws its recommendation to eliminate the notes in Rule 43?

Mr. Goodnow: Any change that is effected by the change in Rule 32 will continue the same as at present. I did not refer to all the rules.

J. J. Tatum (B. & O.): I move that the report of the Arbitration Committee be accepted as amended.

(*The motion was seconded, put to a vote and carried.*)

## Report of Committee on Tank Cars

*This is one of the most important committees of the association. The rapid increase in the quantity of the highly volatile and dangerous casinghead products, and the disasters which have resulted from their shipment in defective or unsuitable equipment, have created for the committee numerous problems which have been and are not only physicallly exceedingly difficult to solve but, because of the conflict of interests involved, require the exercise of the utmost patience and tact in their handling.*

*The work of the committee has not been entirely free from controversy, but it is safe to say that every interest affected will agree without reservation that a never failing spirit of fairness has characterized this work during the chairmanship of the late A. W. Gibbs. This year's report, which was prepared under Mr. Gibb's direction shortly before his death, indicates that steady progress is being made toward the solution of two of the most difficult tasks before the committee, i. e., the development of a satisfactory safety valve and a satisfactory bottom outlet valve.*

THE TANK CAR Committee during the past year has continued its efforts to secure improvement of those tank car features which reports from the Bureau of Explosives and others indicate are the principal sources of trouble, viz., safety valves, dome closing arrangements, heater coils, and the bottom outlet.

### Safety Valves

A safety valve was developed at Altoona in which the contour of the seat, valve and huddling chamber followed very closely the design of a valve submitted by one of the manufacturers of locomotive safety valves which had been previously tested. Some modifications were also made in the form of the wings of the valve disk to reduce the restriction of the discharge area, and the spring was made with six coils instead of five as in the standard design. The test of this valve indicates that the question of discharge capacity at the popping pressure has been satisfactorily solved, as practically full discharge is obtained at the initial pop. This is important in that while the tanks are required to be designed for a bursting strength of 300 lb. per sq. in., this strength does not hold good when the tanks are heated to high temperatures by external fire.

Following this test the valve manufacturing concern has prepared three experimental valves along the same lines and they are now at Altoona for test. It is hoped that these valves will show also a great improvement in the matter of tightness up to the popping pressure. Until the results of these tests are available the Committee is not prepared to make its recommendations as to changes in standard design.

Advices from users of tank cars indicate that great improvement in the performance of the present standard resign of valve as to leakage, etc., may be obtained by proper care and maintenance.

The committee recommends that the dimension of the spring follower of the 5 in. standard safety valve, (Fig. 9-A, Tank Car

Specifications) where the rim and ribs meet, be reduced from 5⅛ in. to 5 in. to prevent binding between the spring and the follower.

Experience having shown that the present six months' test period for safety valves on Class IV tank cars may be safely lengthened, the Committee recommends that the first paragraph of Section 24, Tests of Safety Valves, Class IV Specifications, be amended to read:

Safety valves shall be tested and, if necessary, adjusted at intervals of not over one year, etc.

The attention of the Committee has been called to the fact that because of business conditions some concerns still have on hand a stock of safety valve castings of the 1920 design. Committee recommends that permission be given to place in service any valves now on hand, but that it be required that the patterns be changed at once so that future castings will comply with the requirements of Supplement No. 1 to the specifications for tank cars (effective January 1, 1922).

## Bottom Outlet Valves

The report of the sub-committee which is handling this feature states in part as follows:

Up to March 1, 1922, 28 different designs have been considered, of which 17 are modifications of the present plunger type, nine of the plug type, one a sliding disk and one a rotating disk.

Four designs in present state were recommended for further trial, 13 were authorized for further trial only with the understanding that the designs must first be changed; 9 were eliminated from further consideration. One was authorized for trial November 19, 1921, but has not yet been tried out. One was authorized for trial September 13, 1921, but trial has been suspended pending reports on tests of the lubricating device, which is a feature.

None of the designs we have studied can be considered to have solved the problem of leakage. The four designs in first group, however, show considerable improvement over the present type.

We believe that a valve will not be satisfactory or practical which requires two seats, the aid of gaskets, or a complication of levers and springs. The operating mechanism should be simple, strong and positive in action. Troubles due to sticking appear to be characteristic of valves of the plug and piston type.

The work of this sub-committee will be continued during the coming year.

## Extension of Bottom Outlet Below Sills

The committee in its 1921 report recommended that "the bottom outlet pipe when applied to tank cars having center sills shall not project below the bottom line of sills more than the threaded length necessary to permit the application and removal of the bottom outlet cap." The committee obtained the views of various associations representing tank car users, and after discussion of the subject with representatives of the car builders recommends that Section 7 (c), Specifications for Classes I and II cars, be amended to read as follows:

(c.) Effective July 1, 1923, in the case of replacements on existing cars, bottom outlet valve castings, when applied to tanks having center sills shall be of such length that the extreme projection of outlet cap equipment below the bottom of underframe shall not be more than (Fig. 2):

1. With cap and plug or combination cap and valve on 4-in. outlet—6 in.
2. With 6-in. outlet, 4-in. reducer, cap and plug or combination cap and valve—12 in.

NOTE.—In no case shall extreme projection of bottom outlet equipment extend to within 16 in. above top of rail.

All outlet valve casting caps and attachments shall be secured to the car to prevent loss.

No nipples, valves or other attachments shall project below the bottom outlet cap except while car is being unloaded.

The committee recommends that Section 7 (d), Specifications for Classes III and IV cars, be amended to read:

(d). Effective July 1, 1923, in the case of new cars and replacements on existing cars, bottom outlet valve castings when applied to tanks having center sills shall be of such length that the extreme projection of outlet cap equipment below the bottom of underframe shall not be more than (Fig. 2):

1. With cap and plug or combination cap and valve on 4-in. outlet—6 in.
2. With 6-in. outlet, 4-in. reducer, cap and plug or combination cap and valve—12 in.

NOTE.—In no case shall extreme protection of bottom outlet equipment extend to within 16 in. above top of rail.

All outlet valve casting caps and attachments shall be secured to the car to prevent loss.

No nipples, valves or other attachments shall project below the botom outlet cap except while car is being unloaded.

This carried with it the recommendation of the committee that the effective date of the existing requirement that no nipples, valves or other attachments shall project below the bottom outlet cap except while car is being unloaded, be extended to July 1, 1923, and notice was issued by the Secretary to that effect.

*Breakage Groove in Outlet Pipes.*—The committee recommends that the following paragraph be added to Section 7 (b) of the Class III specifications:

Exception.—In the case of steam jacketed outlets, or where the construction of the outlet pipe is such as to make the breakage groove impracticable, it may be omitted.

## Dome Closing Arrangements

Several designs have been submitted and approved for trial to meet the requirement adopted last year that after July 1, 1922, the dome cover for Class IV cars, if external, shall be secured by bolts; or if internal, by yoke and screw.

The committee recommends that the drawing of Fig. 1, (Approved method of automatically venting pressure on starting removal of dome cover) be made to show the lead gasket projecting not less than ⅛ in. beyond the face of dome cover flange in order to insure the gasket bearing on the dome ring. (The present drawing shows the gasket flush with the cover surface.)

*Heater Pipes.*—After careful consideration and consultation with the American Petroleum Institute the committee recommends that the following requirements be made part of the Tank Car Specifications:

Heating systems in new tank cars and new installations in existing tank cars shall comply with the following general principles:

1. Where heater pipes are installed not less than 2 in. extra heavy pipe and fittings shall be used. All piping shall be properly secured to permit the necessary expansion and contraction and so installed as to provide for self drainage.

2. Cast iron, malleable iron or cast steel return bends shall not be used. Return bends may be forged or made by bending the pipe and using threaded sleeve coupling, forged unions or welded joints. A minimum number of connections shall be used.

3. Single or multiple heater systems may be installed, but the latter is preferable.

4. The steam inlet preferably should be through the top of tank or through dome; the outlet may be either in the end or through the bottom of tank; but both shall be safeguarded by an approved form of cock, cap or plug. Where the discharge is through the bottom of tank, no part of pipe shall extend below bottom of underframe.

Where inlet or outlet pipes pass through the shell of tank, the opening shall be reinforced by suitable pads riveted on inside or outside. The pipe connection preferably shall be expanded or welded, or both, into pad. The outside connection shall not be an integral part of the heater, but it shall be secured to the pad by an approved design.

5. On new installations the heater pipes shall be tight at a hydraulic pressure of 200 lb. The same test shall be applied when the tank is retested.

6. Each compartment of a compartment-tank shall be treated as a separate tank and comply with the foregoing requirements.

7. Designs of heater systems shall be submitted to the American Railway Association for approval before application.

*Compliance With Specifications in Case of Rebuilding Cars or Making Extensive Alterations.*—In view of instances of non-compliance with the specifications and of the very bad workmanship where tank cars have been rebuilt or extensive alterations have been made, the committee recommends that the following requirements be added to Section 25, Inspection, of the specifications for all classes of tank cars.

In case of extensive alterations or rebuilding of tank cars a Certificate of Compliance with the specifications, similar in form to that for new cars, page 47, shall be furnished to the car owner and to the Chief Inspector of the Bureau of Explosives.

*Tests of Tanks of Class IV Cars.*—The committee recommends that the fourth paragraph of Section 23, Tests of Tanks, Class IV Specification, be amended to read as follows:

All test shall be made by completely filling the tank with water of a temperature which shall not exceed 70 deg. F. during the test, care being taken not to spill any water on the tank and that all fittings are tight. The pressure may be applied in any suitable manner. The tank shall hold the prescribed pressure for not less than 20 minutes without leak or evidence of distress, with the source of pressure disconnected. While the tank is under pressure it shall be carefully inspected for evidence of leakage. If the jacket and insulation are not removed, a drop in pressure shall be evidence of leakage, and such portion of the jacket and insulation shall be removed as may be necessary to locate the leak and make repairs. After the repairs have been made the tank shall again be subjected to the prescribed test.

In this connection attention is called to the desirability of using some form of talc wash or graphite paint on the outside of the tank and inside of the sheet iron jacket in order to prevent the insulating material from sticking fast and being damaged so that it can not be re-used when it is necessary to remove it for any purpose.

*Projection of Pipes Above Dome Head.*—The Bureau of Explosives has called attention to the hazards involved by loading or unloading pipes projecting through the dome head. While the committee is not prepared at this time to recommend a limit to the height of such pipes, it calls attention to the desirability that the projection shall be restricted to a minimum.

*Multiple Unit Container Cars.*—During the past year there was submitted to the committee a design for the transportation of liquid chlorine in 15 one-ton containers secured in cradles on a flat car.

While the Tank Car Committee has in the past restricted itself to the sonsideration of cars coming under the definitior. ' "Tank Car" given in the Tank Car Specifications, it was felt in view of the dangerous characteristics of this product that the arrangement should be passed upon from the railroad standpoint, and the Committee, therefore, considered and approved the method of securing the containers to the car.

In this connection, if it is desired that the committee shall consider designs for cars of this type, or cars with wooden tanks for handling muriatic acid, etc., and possibly special cars for other products where the conventional design of tank car is not applicable, it should be definitely advised to that effect.

The report is signed by A. W. Gibbs (Chairman), Penn. System; C. E. Chambers, Central Railroad of New Jersey; Samuel Lynn, P. & L. E.; John Purcell, T. & S. F.; Geo. McCormick, Southern Pacific; F. K. Tutt, M. K. & T.; Col. B. W. Dunn, Bureau of Explosives; A. E. Smith, Union Tank Car Company; Geo Hartley, Semet-Solvay Company, and C. W. Owsley, The Texas Company.

### Discussion

Geo. E. Tiley (General Chemical Company); I believe the Tank Car Committee should be given authority to include all types of tank cars within the scope of their investigations. The time has come when there are special types of tank cars being considered which are not now covered in the tank car specification. About two years ago a number of the acid manufacturers were in consultation with the Bureau of Explosives on the design of a special car for the transportation of hydrochloric or muriatic acid, which cannot be transported in either wooden or steel cars. The General Chemical Company ships this particular acid in very large quantities and we are at present using a wood lined car with the interior of the wooden tank prepared with a special tar and pitch mixture as a coating and an intermediate filler of about two inches of the same material to prevent the acid getting through the steel shell if it works its way through the wooden lining.

The average life of the tanks of those cars is about three years at the most and at times they create a very nasty situation for the railroads when they spring a leak en route, because it means in every case either sacrificing the acid or moving the car by a special movement to the nearest plant where it could be unloaded, regardless of the customer to whom it was consigned. Colonel Dunn and myself discussed the proposition and finally a special committee was appointed which is now at work upon it.

One acid concern, for illustration, has in service at the present time as an experiment a steel tank with a hard rubber lining; also a semi-hard rubber lining. We have two experimental cars with transverse wooden tanks, the insides of which are first fitted with canvas backing and then with a soft rubber lining. There are a number of other types of muriatic acid cars under experiment at the present time, and that is what the Tank Car Committee has in view in bringing this matter to your attention.

I believe in view of the special conditions which are being encountered in the acid business, as well as some of the other businesses, the time has come for the Tank Car Committee to consider tank cars of all descriptions and that the definition of the tank car should be modified accordingly.

Mr. Tatum: I would like to ask the Tank Car Committee if it has given any consideration to the fact that when tank cars are built and prepared for the heater pipe system, and the heater pipe system is not applied, plugs are applied to the outlets of the pipes. There is a method by which those plugs may be held in place to keep them from working out when cars are under load with such materials as act as lubricants upon the thread of the plug. We find from experience that these plugs become lubricated by certain materials and by the vibration of the tank they work loose and discharge their contents. We find also that cars sometimes are bought with heater pipes in them for certain commodities and then are sold to other persons who do not have use for the heater pipes. These pipes are then removed and plugs applied to the holes through which the pipes pass. The same plugs become lubricated by the materials hauled in the tank cars and work out and discharge the load.

We had an experience a short time ago where a car was loaded with cotton seed oil. The car was received at interchange apparently with all plugs tight and in good condition. The vibration of the tank and the lubricant acting on the plug resulted in a leak taking place at the plug. The car inspector seeing the leak attempted to tighten the plug, but it was so near out of the cistern that it discharged the entire contents and had to be paid for. But worse than that, the inspector was almost drowned in the oil; he could hardly get out in time to save himself. It seems to me there should be some method by which these plugs could be secured so they would not work out, just as we double-nut bolts or have a lock nut to prevent them from working off. I would like to ask the Tank Car Committee if that has been given consideration.

Mr. Chambers: There was some action on that at the 1920 convention. Perhaps you do not have it in mind so I will read it. On page 690 of the 1920 proceedings, through a question raised by you, this answer was made: "Where heater pipes are used it is frequently the practice to make an opening in the one head of the tank for handling the pipes in and out. This opening, as a rule, is closed by a plug, screwed through the sheet or through a flanged fitting. There have been a number of failures of these plugs involving, in addition to loss of contents of the tank, injury and loss of life. In all cases it developed that the failure was due to the use of a cast plug cored on the inside for lightness.

"The committee recommends that the specifications require that where plugs are used in the heads of tanks of new tank cars, or as replacements in the case of existing cars, they shall be solid, of a good grade of grey cast iron, standard pipe thread and taper, and of a length which will screw at least six threads inside the face of fitting on the tank."

Mr. Tatum: Is it the opinion of the Tank Car Committee that the plug will not work out?

Mr. Chembers: I do not see how it will work out more than any plug you have in other places, and will not take lubrication if you tighten it.

Mr. Tatum: We tighten bolts, but even then we have them fall off. The matter, as it appears to me, is a very important one, and there should be some positive lock for the plugs, so that they cannot work out even though the inspector or repair man fails to screw it in tightly.

Mr. Chambers: I ask how many instances Mr. Tatum knows of where this failure occurred?

Mr. Tatum: I know of one instance where it cost $10,000, and other instances where it did not cost so much, but I do not believe that the Baltimore & Ohio, from my observations of other railroads, is the only road that has had such experiences.

Mr. Chambers: That is the first time I have heard of such accidents to tank cars in handling. You will find in Section B that this was referred to letter ballot, but I can say for Mr. Tatum's benefit that we will very thoroughly consider this subject at our next meeting, and if we can find enough justification to make any change, we will do so.

Chairman Tollerton: Now is the opportunity to air your views and get important information from the Committee on Tank Cars and from others using tank cars. Considerable improvements are being made in tank cars for the shipment of explosives and it is important that you should get all the information you can. Full discussion of

this question is very desirable. We have with us today some representatives from the private tank car lines, and I would like to hear from Mr. Hartley.

G. Hartley (Semet-Solvay Company): I am also a member of the Tank Car Committee. I do not believe it is necessary to say anything more than what we have covered by our reports. I certainly would suggest, however, that in the case of any tanks offered for transportation after the test date has expired, that railroads should not transport such cars. When this is done disastrous results sometimes follow. In one case that I have in mind a car loaded with what is called pure ammonia (30 per cent) was put on the road and a few days afterward the inspector found that the test date had expired and he attempted to test the safety valve. In doing this he used a gage which showed 90 deg., and lifted the valve at 25 lb. pressure. The commodity inside the tank had generated a pressure and was also expanded up above the outlet for the safety valve. When the safety valve did lift, the ammonia rushed out and caused a loss of life. There is certainly no good reason for testing a safety valve which generates pressure under a load, after the test date has expired, as you have that indeterminate pressure on the other side of the valve. The tank car should not be accepted unless the safety valve is well within the test date shown on the car, which test date will not expire for a reasonable time.

Chairman Tollerton: Is Mr. Smith, of the Union Tank Car Company present?

A. E. Smith (Union Tank Car Company): I am a member of the committee and I would like to say that we are trying to provide the safest transportation we can supply and have constantly studied the tank car situation. In the case of any improvements which have been developed in the service of the car, we are glad to submit them to the Tank Car Committee.

Mr. Goodnow: I ask the Tank Car Committee, now that they have included in the specifications the heater piping, whether or not any consideration was given to the number of feet of radiation which should be provided, taking into consideration the number of commodities carried in the tank cars. That question is up with us. The number of feet of tank car heater piping affects the car capacity. It seems to me that there cannot be any difference in the heating pipes provided in a car. They should be included as a part of these specifications, so as to hold it to a minimum and maintain the carrying capacity of the car to as great a degree as possible.

Mr. Chambers: The heater pipe question has been considered by the committee for two or three years from every angle from which it could be approached. We do not feel it is within our province to tell a builder or a user how much piping must be used. We can only make specifications on the pipe and fittings. The man who loads the material will know what the radiation must be in order to unload it. And if it does not conform to those requirements, the users would make a protest. I do not feel that is a subject within our province. We have at the present time a sub-committee composed of members of the American Petroleum Institute which co-operates with us in all this work very fully.

*(A motion that the report be received and submitted to letter ballot was duly seconded, put to a vote and carried.)*

Chairman Tollerton: Your attention is called to the fact that this motion just adopted does not dispose of the question covered in the recommendation of the Committee on Safety Valves. Therefore, an additional motion will be necessary to cover that question. I will read it: "The committee recommends that permsision be given to place in service any valves now on hand, but that it be required that the patterns be changed at once, so the future castings will comply with the requirements of Supplement No. 1.

Mr. Fuller: How many castings are there on hand, and to what extent would it hurt the car owners if that recommendation was not carried out? Have you any information at hand to know the number of castings in stock of the old design?

Mr. Chambers: It is only a limited number. The secretary says, as he recalls it, it would take about two years at the present rate to use them up.

Mr. Fuller: Would it be a hardship to scrap them? My thought is this: We have been told to extend the time and we have done so in the case of a great many things, but if this particular proposition as to the amount of old valves on hand is not of any great magnitude, the question is, would it not be better to go into the use of the steel valve as early as possible?

Mr. Chambers: Our thought and action in regard to material which may happen to be on hand has always been to not show a wasteful tendency. I do not know that it would be an extreme hardship if we set the date from which time on the new pattern will have to be used. This would mean the scrapping of a number of the old valves, but I do not think that it would amount to a great deal.

Mr. Fuller: I believe it has been your observation, as it has been mine, that we have had many requests for extensions of time with regard to the application of materials to tank car work when the materials could have been used for something else. Take the thickness of the plate used in the construction of the tank itself. This association continued to make extensions when the new application should have been put in force. A few years ago we were confronted with the fact that the manufacturers were building tanks that would not comply with the specifications. We have to consider, of course, the question of the waste of material, but at the same time we feel that if certain recommendations are designed for the improvement of the equipment we should benefit by that improvement as soon as possible.

Mr. Chambers: I am sure the committee would gladly accept any time limit the association wishes to place on this, and we will act accordingly.

Mr. Hartley: I believe that all the tank car builders about two or three years ago bought as much material required in the construction of tank cars as they could get, because they felt that there might be a scarcity in the future. I know that considerable material has been purchased and included in the stocks held at the present time, in the way of accessories. These materials and accessories were very high in price. I think that fact should be borne in mind and that time should be given for the tank car builders to use up that material.

I think the Tank Car Committee has in mind, while they are trying to better these accessories and conditions, to allow these people to use up some of this material which they bought at a high price. This question was considered by the committee last summer, in fact, during the past year of depression, and it was not thought that hardship would be imposed on any concern in the matter of saving money. That is, there would not be any unnecessary burdens added to the manufacturers in the way that has been referred to, if it was felt that the committee in permitting the use of the older material, was not endangering tank car service.

Mr. Fuller: I think it is important there should be a time limit set. I think it is too wide open to let it stand until all the castings are used up. It has been my observation, and the observation of others, that the patterns are not changed. We find that even after the time limit has expired they are still using castings of the old pattern to

a greater or less degree, and I think a time limit should be stated and adhered to.

I will make a motion, embodying an amendment to the report of the committee, and I would like the benefit of the information from the committee as to what they know of the amount of castings now on hand of the old pattern. Of course we have had certain information on that point but I now move as an amendment, that the time limit be set as either January, 1923, June,1923, or January, 1924, whichever date may meet the ideas of the committee. My idea is to make the time limit as early as possible and if necessary it can be extended, but I do not think it should be left wide open. I will make my motion more definite and move that June, 1923, be set as the time.

Mr. Chambers: The Tank Car Committee will make recommendations to the General Committee, very shortly, as to what the rate should be.

Chairman Tollerton: With that understanding, we will pass without formal motion.

The chairman of the Tank Car Committee also calls attention to the last paragraph of the report, and desires that the convention give some instructions from the floor as to the policy of the committee with regard to an investigation of the various types of tank car construction.

Mr. Goodnow: I move that the duties of the Tank Car Committee be extended to cover such other classes of tank cars as have been referred to and that any others may be added from time to time in connection with their work.

Chairman Tollerton: Do you think that motion covers the field you have in mind, Mr. Chambers?

Mr. Chambers: I think it does, Mr. Chairman.

(*The motion was duly seconded, put to a vote, and carried.*)

Mr. Chambers: Mr. Grant, of Colonel Dunn's department, was not in the room when you called for him, but came in immediately after we closed the subject, and he has given me permission to use some correspondence which passed between Colonel Dunn's bureau and the Commission at Washington on the particular case that Mr. Hartley mentioned, about the testing of a car of ammonia while loaded, resulting in a man's death.

When Colonel Dunn learned of this accident which resulted in a fatality he wrote Mr. Doyle, explosives agent of the Interstate Commerce Commission at Washington, as follows:

June 7, 1922.

MR. L. I. DOYLE, Explosives Agent,
Interstate Commerce Commission.

Answering your letter of June 3, file 3666 relative to proposed amendment of paragraph 402 of the revised regulations, I agree with you on the suggested wording as follows:

> "Safety valves on tank cars must not be tested while these cars are loaded with dangerous articles. Whenever this test is due on a loaded car while in transit, the car must be allowed to continue to destination bearing a defect card with the following notice:
>
> Safety valves overdue for test. Moving under I. C. C. 402.
>
> Prompt report of such movements must be made by carriers issuing the defect cards to the chief inspector, Bureau of Explosives, 30 Vesey Street, New York City."

Having made some inquiries of representatives of car owners and railroad inspection forces I find such a ruling will be favorably received by them. I am also advised that if we can be reasonably sure that this amendment will be adopted, steps will be taken by the Arbitration Committee of the American Railway Association to provide suitable changes in their mechanical rules to harmonize with the use of defect cards as outlined in this amendment.

The A. R. A. Mechanical Section holds its annual meeting next week at Atlantic City and it seems desirable, if possible, that we inform them before that time if this amendment will be adopted, so that their action may be taken then.

Kindly advise at your earliest convenience.

COL. B. W. DUNN,
*Chief Inspector.*

Mr. Chambers: I will read the answer from Mr. Doyle, as follows:

COL. B. W. DUNN,
Chief Inspector.

Referring to your letter of June 7, concerning the amendment of proposed paragraph 402 of the revised regulations:

It cannot be stated at this time what action the Commission will take as an assurance to the A. R. A., Mechanical Section, but the inquiries which you have made and your recommendation indicate the value and propriety of the regulation and it will be recommended for the Commission's adoption. No reason is now seen for refusal of the Commission to give necessary approval, and though more definite advice on the subject cannot now be given it is suggested that changes might be prepared in A. R. A. rules to be effective upon receipt of the Commission's approval of the regulations. Presumably this approval, if given, may be expected by the first of July, or soon thereafter.

L. I. DOYLE, *Explosives Agent.*

## Proposed Addition to Rules of Interchange on Tank Cars

Mr. Chambers: In view of that the Tank Car Committee would like to recommend to the section—to be placed before the Arbitration Committee—that this be added to the rules of interchange on tank cars:

"Safety valves on tank cars must not be tested while under load. Whenever this test is due on a loaded car while in transit, the car must be allowed to continue to destination bearing a defect car with the following notice: 'Safety valve overdue for test. Moving under I. C. C. 402.'

"Prompt report of such movements must be made by the carriers issuing the defect cards to the Chief Inspector, Bureau of Explosives, 30 Vesey Street, New York City."

It may be that a number of people have not been confronted with a request to move a car already loaded on which the test date has expired, but in districts where competition is keen and business is sought after, many times a little pressure on a road has caused it to move a car when it knew it was in violation of some rule, with the threat made in this manner,: "Well, all right, if you don't take it, so and so will"—and many times so and so does.

So I think this is a proper safeguard to cause a car to be moved.

C. F. Giles (L. & N.): I move, Mr. Chairman, that resolution be approved.

(*The motion was seconded, put to a vote and carried.*)

Mr. Calkins: Would the issuing of a defect card under those conditions penalize the delivering line with the cost of making the test?

Mr. Chambers: That is something the Arbitration Committee should work out. I would say that would not enter into this materially because whoever makes the test bills the owner for the cost of it, so nobody will lose and nobody will gain.

# Report of Committee on Loading Rules

*The preparation of rules governing the loading of freight cars has been an important part of the work carried on by the Master Car Builders' Association and its successor, the Mechanical Division of the American Railway Association. The committee has been in existence many years but changing conditions require additions and modifications in the rules and the members still find a broad field for their activities as the numerous revisions submitted in this year's report demonstrate.*

*The preparation of the loading rules may seem an easy matter to anyone making a casual examination of the code. However, the necessity for considering clearances, stability and stresses introduces problems which often require considerable ingenuity for solution. The need for adhering to methods of securing loads that are simple and inexpensive and employ only material that can be easily obtained makes the work still more difficult. The committee since its inception has performed an important service in improving operation which has often not received due recognition.*

THE COMMITTEE HAS considered all suggestions for modifications of and additions to the Loading Rules presented by the members of the association as well as shippers and has held joint conferences with the latter to the end that the Loading Rules may be kept up to date and take care of any new methods of loading that may be presented. As a result of this procedure, the committee submits the following recommendations for approval and submission to Letter Ballot for adoption as standard of the association.

RULE 5

PROPOSED REVISION OF TABLE OF LOAD WEIGHTS

PROPOSED FORM

| Marked Capacity or Car | Total Weight of Car and Lading | Load Weight |
|---|---|---|
| 100,000 | *169,000* | *169,000* less light weight of car. |

Explanation.—Table revised to show 169,000 lb. in place of 161,000 lb. as total weight for car and lading (100,000 lb. capacity car) to conform with Interchange Rule 86.

PROPOSED REVISION OF RULE 9-E, FIRST PARAGRAPH

PROPOSED FORM

RULE 9-E. For twin or triple loads of long flexible material such as plates or similar lading requiring *more than two* sliding-pieces in addition to the bearing-pieces (*See Figs. 67 and 68*) the weight of lading must not exceed *two-thirds* the capacity of car *and the total weight of lading must not exceed 150,000 lb.* For materials of less flexibility such as heavy channels and I-beams *requiring two sliding-pieces in addition to the bearing-pieces* as per *Fig. 63, 65 and 66 or for rigid materials, as per Figs. 62 and 64, requiring two bearing-pieces and no sliding-pieces, the weight of lading shall be determined by the location of bearing-pieces* as per Rules 6, 9-A, 9-B and 9-C.

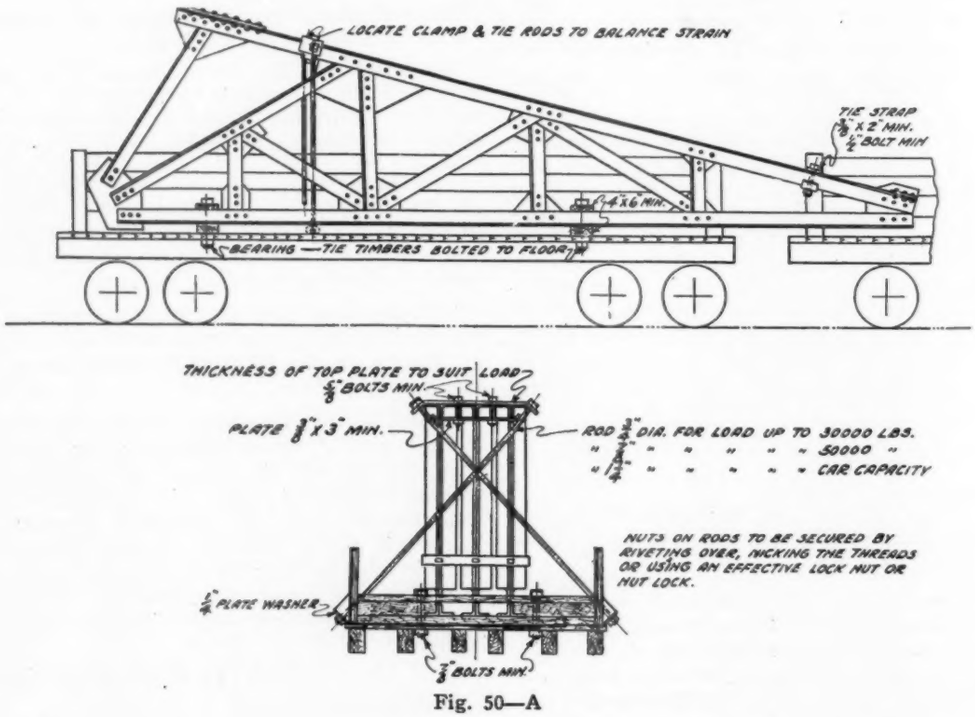

LOCATE CLAMP & TIE RODS TO BALANCE STRAIN
TIE STRAP
⅜" X 2" MIN.
¾" BOLT MIN
4"X6" MIN.
BEARING — TIE TIMBERS BOLTED TO FLOOR
THICKNESS OF TOP PLATE TO SUIT LOAD
¾" BOLTS MIN.
PLATE ⅜" X 3" MIN.
ROD ¾" DIA. FOR LOAD UP TO 30000 LBS.
" " " " " " 50000 "
" 1" " " " " CAR CAPACITY
NUTS ON RODS TO BE SECURED BY RIVETING OVER, NICKING THE THREADS OR USING AN EFFECTIVE LOCK NUT OR NUT LOCK.
¼" PLATE WASHER
¾" BOLTS MIN.

Fig. 50—A

Explanation.—Rule revised to more clearly define loads of flexible material and to increase allowance load of flexible and semi-flexible material.

RULE 13

PROPOSED CHANGE IN TABLE RULE 13

In the table, it is proposed to increase the allowable width of load for loads having overhang of 19 ft., 6 in. and above. The clause "but shipments may contain pieces overhanging as much as 24 ft. provided the average length of overhang of the total load does not exceed 18 ft." preceding the table to be indicated in heavy type to direct attention to same in connection with increased width allowance.

PROPOSED FORM

| Length of Overhang C | Width of Load W | Length of Overhang C | Width of Load W |
|---|---|---|---|
| 9 ft. 0 in. | 9 ft. 5 in | 18 ft. 0 in. | 8 ft. 1 in. |
| 10 ft. 6 in. | 9 ft. 2½ in. | 19 ft. 6 in. | *7 ft. 9 in.* |
| 12 ft. 0 in. | 9 ft. 0 in. | 21 ft. 0 in. | *7 ft. 5 in.* |
| 13 ft. 6 in. | 8 ft. 9½ in. | 22 ft. 6 in. | *7 ft. 1 in.* |
| 15 ft. 0 in. | 8 ft. 7 in. | 24 ft. 0 in. | *6 ft. 9 in.* |
| 16 ft. 0 in. | 8 ft. 4 in. | | |

Explanation.—Increased width for loads having long overhang can safely be permitted if the average length of overhang of the total load does not exceed 18 ft.

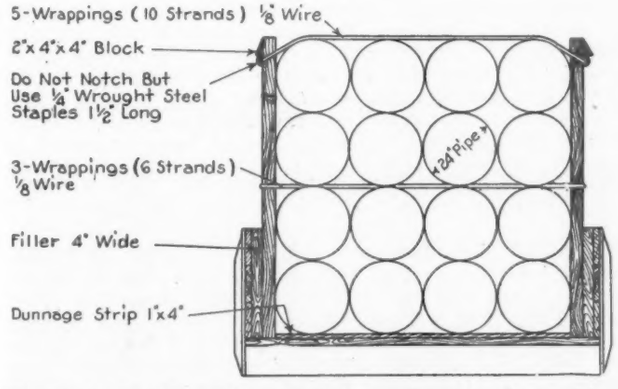

5-Wrappings (10 Strands) ⅛" Wire
2"x4"x4" Block
Do Not Notch But Use ¼" Wrought Steel Staples 1½" Long
3-Wrappings (6 Strands) ⅛ Wire
Filler 4" Wide
Dunnage Strip 1"x4"
24" Pipe

**Fig. 81-A—Loading Wrought Pipe on Gondola Cars. Pipe 24 in. in Diameter**

PROPOSED REVISION OF RULE 18

PROPOSED FORM

RULE 18. *The location and number of hand brakes shown in the various cuts is not necessarily the hand brakes that are to be provided,* but a group of cars must have at least one accessible and operate hand brake for each multiple of three cars or fraction thereof. There must be a clearness of at least six in. between the brake wheel and lading, this clearance to extend the width of the car.

Explanation.—Reference to hand brakes as shown on the various cuts has been added to the rule to clarify same.

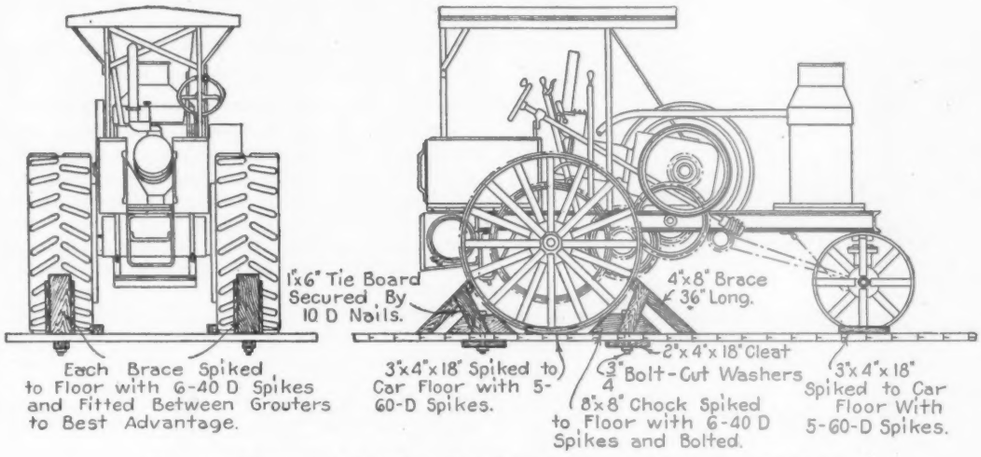

1"x6" Tie Board Secured By 10 D Nails.
4"x8" Brace 36" Long.
2"x4"x18" Cleat
Each Brace Spiked to Floor with 6-40 D Spikes and Fitted Between Grouters to Best Advantage.
3"x4"x18" Spiked to Car Floor with 5-60-D Spikes.
¾" Bolt-Cut Washers
8"x8" Chock Spiked to Floor with 6-40 D Spikes and Bolted.
3"x4"x18" Spiked to Car Floor With 5-60-D Spikes.

**Fig. 104—Manner of Loading Gasoline Tractor Engines on Flat Cars**

ADDITIONS TO TABLE UNDER RULE 23

MAXIMUM WEIGHT OF LOAD—FOR LOADS AS PER F|7:. 7, 8, 9, 23, 24, 52, 54 AND 55

| Length of Car Over End Sills | Average Length of Material | Capacity of Cars 60,000 lb. | Capacity of Cars 80,000 lb. | Capacity of Cars 100,000 lb | Capacity of Cars 140,000 lb. |
|---|---|---|---|---|---|
| | 42 ft. | | 79,000 lb. | | |
| | 44 ft. | | 75,000 lb. | | |
| | 46 ft. | | 71,000 lb. | | |
| 42 ft | 48 ft. | | 67,090 lb. | | |
| | 50 ft. | | 64,000 lb. | | |
| | 52 ft. | | 61,000 lb. | | |
| | 54 ft. | | 58,000 lb. | | |
| | 48 ft. | | | 110,000 lb. | |
| | 50 ft. | | | 105,000 lb. | |
| | 52 ft. | | | 101,000 lb. | |
| 48 ft | 54 ft | | | 97,000 lb. | |
| | 56 ft. | | | 93,000 lb. | |
| | 58 ft. | | | 88,000 lb. | |
| | 60 ft. | | | 84,000 lb. | |

Explanation.—Limits for 42 ft. cars of 80,000 lb. capacity and 48 ft. cars of 100,000 lb. capacity added to table to take care of existing equipment not covered by the table.

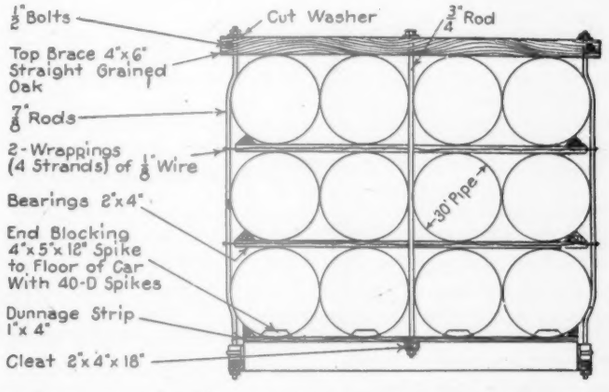



**Fig. 81-B—Loading Wrought Pipe on Flat Cars. Pipe 30 in. in Diameter**

PROPOSED REVISION OF RULE 27

PROPOSED FORM

RULE 27. Where the dimensions of bearing-pieces or sliding-pieces are not otherwise specified, they must be of sufficient thickness to keep the lading four in. from the floor or end gates of

carrying car and idler, and must extend the full width of car. Bearing-pieces more than five inches high may be built up of lumber of ample strength or take the shape of cribbing or rolled or built-up steel construction. Bearing-pieces, sliding-pieces, chocks, head-blocks, etc., must have a width at least equal to their height. For structural and similar material, the bearing-pieces must be securely fastened to the floor of the car as shown in Figs. 48 or 53. For number, logs, telegraph poles, piling and props and similar material on open cars loaded as per Figs. 8,

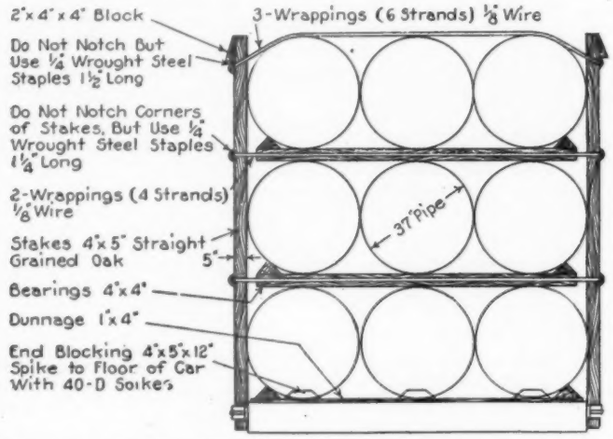

2"x4"x4" Block
Do Not Notch But Use ¼" Wrought Steel Staples 1½" Long
Do Not Notch Corners of Stakes, But Use ¼" Wrought Steel Staples 1¼" Long
2-Wrappings (4 Strands) ⅛" Wire
Stakes 4"x5" Straight Grained Oak
Bearings 4"x4"
Dunnage 1"x4"
End Blocking 4"x5"x12" Spike to Floor of Car With 40-D Spikes
3-Wrappings (6 Strands) ⅛" Wire
37" Pipe
5"

**Fig. 81-C—Loading Wrought Pipe on Flat Cars. Pipe 37 in. in Diameter**

11, 12 and 13, the bearing-pieces must be securely held in place by cleats, as per Fig. 2.

Explanation.—Reference for manner of securing bearing-pieces changed from rule 207 to Figs. 48 or 53 to cover both methods of securing bearing-pieces.

RULE 102—PROPOSED PARAGRAPH TO BE ADDED

RULE 102. *Proposd Additional Paragraph:* Where timbers of different sizes are loaded, they should, when possible, be

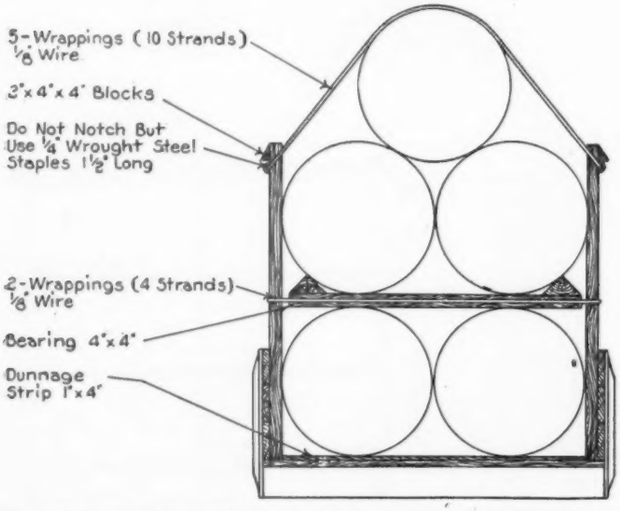

5-Wrappings (10 Strands) ⅛" Wire
2"x4"x4" Blocks
Do Not Notch But Use ¼" Wrought Steel Staples 1½" Long
2-Wrappings (4 Strands) ⅛" Wire
Bearing 4"x4"
Dunnage Strip 1"x4"

**Fig. 81-D—Loading Wrought Pipe on Gondola Cars. Pipe 43 in. to 49 in. in Diameter**

arranged in layers of uniform thickness across the car and have parting strips used as prescribed in the first paragraph of this rule. Where the sizes will not permit of uniform layers across the car the height of loads must be restricted to four feet above floor of flat cars and three feet above top of sides of gondola cars.

Explanation.—Loads of this description have given trouble by becoming disarranged enroute and falling from cars, therefore, a new paragraph has been added to specifically cover the method of loading such timbers.

PROPOSED CHANGE IN RULE 200

RULE 200. In the ninth line of this rule it is proposed to change the wording "sixteen-penny nails" to "ten-penny nails."

Explanation.—Changed to conform with the requirements of General Rule 15.

PROPOSED CHANGE IN FIG. 43-A

FIG. 43-A. It is proposed to specify 1 in. by 5 in. tie boards and diagonal braces in place of 1 in. by 6 in. as shown.

Explanation.—Size of tie boards and braces changed to conform with Fig. 42.

PROPOSED REVISION OF RULE 202—THIRD PARAGRAPH

PROPOSED FORM

## Supplementary Report

RULE 202. Third Paragraph: Determine number of posts required by dividing total weight of lading by load allowed per post. There must be a minimum of two posts per pile. *Two by six inch hardwood timbers extending from top of car side to top of lading must be used to prevent creeping of the plates. These timbers shall be spiked to the post and in addition shall be secured at the top by the diagonal tie rod.* Total weight of

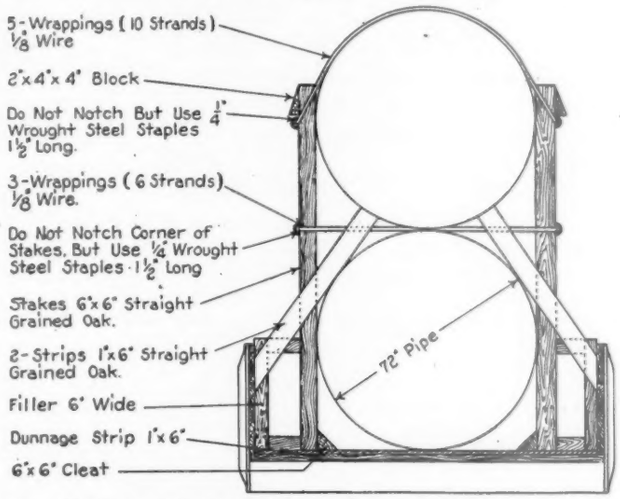

5-Wrappings (10 Strands) ⅛" Wire
2"x4"x4" Block
Do Not Notch But Use ¼" Wrought Steel Staples 1½" Long.
3-Wrappings (6 Strands) ⅛" Wire.
Do Not Notch Corner of Stakes, But Use ¼" Wrought Steel Staples 1½" Long
Stakes 6"x6" Straight Grained Oak.
2-Strips 1"x6" Straight Grained Oak.
Filler 6" Wide
Dunnage Strip 1"x6"
6"x6" Cleat
72" Pipe

**Fig. 81-E—Loading Wrought Pipe on Gondola Cars. Pipe 72 in. in Diameter**

plates loaded diagonally must not exceed 75 per cent of the load weight as per General Rule 5. Short material may be loaded on car floor, if equally distributed over entire floor; total weight of entire lading must not exceed the load weight as per General Rule 5. Upright posts may all be staggered as shown in Fig. 44. Bearing-pieces spiked to the floor and sides of the car, may be used at the lower edge of plates as may be required by loading and unloading facilities. When used, the size of bearing pieces is optional but they must be located opposite each post and longitudinal shifting of the plates prevented *either by stop blocks spiked to side and floor of car, stop blocks bolted to side of car or horizontal tie rods across the car.*

Explanation.—Paragraph has been revised to provide 2 in. by 6 in. timbers secured to outside face of supporting posts to prevent creeping of the plates, and to provide an alternate method for securing stop blocks by bolting them to side of car.

PROPOSED REVISION OF RULE 202—LAST PARAGRAPH

PROPOSED FORM

RULE 202. Last Paragraph: Round plates flat or flanged, may be loaded as per Figs. 44-B, 44-C or 44-D. This manner of loading is the same as for ordinary plates, except that when loading according to Figs. 44-B and 44-C a 4 in. by 8 in. horizontal bearing-piece is bolted at top of posts to form a rest for the plates. Longitudinal shifting *of the plates to be prevented either by stop blocks spiked to side and floor of car, stop blocks bolted to side of car or horizontal tie rods across the car.*

Explanation.—Paragraph revised to provide an alternate method for securing stop blocks by bolting them to side of car.

*(See Fig. 50-A on page 1446.)*

RULE 208. PROPOSED PARAGRAPH TO BE ADDED

RULE 208. *Proposed Additional Paragraph:* An alternate method of loading open girders, half roof trusses and similar material by using rod and plate material is covered by Fig. 50-A.

Explanation.—Alternate method of loading is provided at the suggestion of steel shippers in order to permit use of rod and plate material available at the mills.

PROPOSED REVISION OF RULE 221
PROPOSED FORM

RULE 221. The idlers used with loads as shown in Fig. 52 must be flat cars unless the width of the overhanging load is *less than the width given for each length of overhang in the table of General Rule 13, by an amount equal to the difference between 11 ft. 0 in. and the inside width of gondola car used.*

Explanation.—Rule has been revised to govern width of overhanging load by inside width of the gondola car used as an idler. This arrangement makes the rule more flexible and will permit wider loads when wide gondola cars are used.

PROPOSED REVISION OF RULE 227-D
PROPOSED FORM

RULE 227-D. Binders consisting of two vertical hardwood pieces of timber, 6 in. by 8 in. in section with ½ in. bolts and suitable washer under head and nut in each end to prevent splitting, drawn together by means of two 1¼ in. rods, one on top and one below load, shall be applied to all loads as follows:

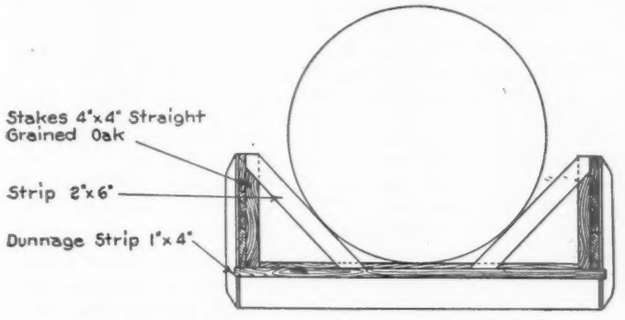
Loads up to four feet in height, one binder located midway between bearing-pieces.

*Loads four feet and not over six feet in height, two binders, located between bearing-pieces, each binder to be located three feet from bearing piece.*

Explanation.—Rule has been revised to permit two binders in place of three binders on loads five feet and not over six feet in height and location of binders has been specified to be between bearing pieces and three feet from the same instead of either side of bearing-piece and six in. from same. Test loads were followed to destination which established the safety of the proposed change in number and location of binders on these loads.

PROPOSED CHANGE IN RULE 230

RULE 230. *Proposed Change:* Substitute "General Rule 27" for "Detail Rule 227" in the next to last line of this rule making the last sentence of the rule read as follows: "The bearing-pieces must be secured to the car in the manner described in




NOTE.— Not less than three pair of braces to each length of pipe.

**Fig. 81-F—Loading Wrought Pipe on Gondola Cars. Pipe 84 in. to 96 in. in Diameter**

General Rules Nos. 26 and 27 and the material must be clamped together in the manner described in Rule 231 to prevent it from shifting."

Explanation.—Reference to Detail Rule 227 is an incorrect reference.

PROPOSED CHANGE IN FIG. 61

FIG. 61. It is proposed to change the size of lateral braces shown on this cut from 3 in. by 8 in. to 2 in. by 8 in.

It is proposed to change the top clamp from 4 in. by 6 in. to 6 in. by 8 in. and show ½ in. bolts in ends to prevent splitting.

Explanation.—Size of braces changed to conform with braces shown on Figs. 56 and 57. Top clamp changed to conform with top clamp shown on Fig 53.

PROPOSED CHANGE IN FIGS. 62, 63 AND 67

FIGS. 62, 63 AND 67. It is proposed to eliminate the dimensions of bearing-pieces from these figures and substitute a notation reading "Bearing-Pieces as per Rule 227."

FIGS. 63 AND 67. It is proposed to eliminate the dimensions of metal sliding plates from these figures and substitute a notation reading "Dimensions of Sliding Plates Must Conform with Rule 230."

Explanation,—Reference is made to Rule 227 for size of bearing-pieces in order to cover both sizes that are permissible. Reference is made to Rule 230 for dimensions of metal sliding plates in order to cover both sizes that are permissible.

PROPOSED CHANGES IN FIGS. 64, 65, 66 AND 68

FIGS. 64, 65, 66 AND 68. It is proposed to eliminate the dimensions of bearing-pieces from these figures and substitute a notation reading "Bearing Pieces as per Fig. 61."

It is proposed to eliminate the dimensions of metal sliding plates from these figures and substitute a notation reading "Dimensions of Sliding Plates Must Conform with Rule 230."

Explanation.—Reference is made to Fig. 61 for size of bearing-pieces in order to cover both sizes that are permissible. Reference is made to Rule 230 for dimensions of metal sliding plates in order to cover both sizes that are permissible.

*(See Fig. 104 on page 1447.)*

PROPOSED CHANGE IN FIG. 104

FIG. 104. It is proposed to eliminate the longitudinal blocking at front wheel and apply more substantial blocking at rear wheels to prevent any longitudinal motion.

Explanation.—The longitudinal blocking at front wheel has been removed to prevent bending of the king pins.

PROPOSED REVISION OF RULE 309
PROPOSED FORM

RULE 309. If box cars are used for loading heavy machinery such as lathes, planers, boring machines, etc., each machine should be blocked by securely nailing *or bolting* to floor of car 2 in. by 4 in. hardwood strips fore and aft. Machinery resting on legs should be securely braced and propped at ends, *but in no case should the legs be blocked or in any way secured to the car floor. Where there is danger of the legs becoming broken they should be removed and the machine crated when practical. The legs to be secured in same crate with the machine.*

Explanation.—Rule revised to provide more definite instructions for loading machinery to overcome breakage of legs.

The committee has been advised recently by pipe manufacturers that wrought pipe or tubing ranging from 24 in. to 96 in. in diameter is being offered for shipment to the railroads. The present pipe loading rules do not cover these larger sizes of pipe and after conference with the shippers revised rules and cuts have been worked out to cover this loading.

The following revision of the pipe loading rules, with new cuts to cover these shipments, are submitted for your approvel at this time.

REVISION OF RULE 249

RULE 249. *First sentence of first paragraph.* There should be not less than three pairs of stakes to each pile, when the material is 23 ft. or less in length, the top of each pair of stakes to be held together by *not less than* six strands equal to three wrappings of good ⅛ in. diameter wire resting on the pipe, in addition to any intermediate wiring or dunnage strips for character of shipments, as provided for in succeeding paragraphs.

Explanation.—Rule revised to cover additional wiring at top of stakes as used in loading large sizes of wrought pipe.

REVISION OF RULE 255, PROPOSED FORM

RULE 255. First Sentence. *Gondola or Flat Cars.* All cast iron pipe 24 in. or more in diameter must be loaded in pyramidal form, with the bell ends interlocking each other.

Explanation.—Rule changed to omit reference to wrought iron pipe account of same being covered in new Rule 251-A.

RULE 251-A—PROPOSED NEW RULE

RULE 251-A. Flat and Gondola Cars: Wrought iron pipe 24 in. or more in diameter when loaded on flat or gondola cars should be loaded in accordance with Figs. 81-A, 81-B, 81-C, 81-D, 81-E or 81-F.

Explanation.—New paragraph and cuts added to cover the loading of large size wrought iron pipe.

The report is signed by R. L. Kleine (Chairman), Pennsylvania Railroad; J. J. Burch, Norfolk & Western; E. J. Robertson, Soo Line; J. E. Mehan, Chicago, Milwaukee & St. Paul; Samuel Lynn, Pittsburgh & Lake Erie; Ira Everett, Lehigh

Valley; T. O. Sechrist, Louisville & Nashville; E. N. Harding, Illinois Central and G. R. Lovejoy, Detroit Terminal.

### Discussion

R. L. Kleine (Penn. R. R.): It has been found that the bottom plates creep up over the posts and extend into the clearance limits, and the committee formerly had in the rule a vertical 2 in. by 8 in. bolted to the post to prevent this creeping. The rule was afterwards modified as that was considered unnecessary, but since we have taken it off we have found that these plates creep and therefore a provision of that kind has been re-inserted in the rule. Some of the shippers, since we made this suggestion, have tried out that method and on account of their loading facilities find that they cannot swing the plates into place on the cars because of this projecting piece, and I suggest that the convention allow an alternate provision to be inserted in the rules to read as follows: Add the following after the word "rod" in twelfth line: "As an alternate method to prevent creeping, plates 24 in. long, 6 in. wide and not less than ½ in. thick, secured to the outside of post by the diagonal tie rod and by one ⅝-in. bolt to prevent turning, may be used."

These various shipments have been tried out, followed to destination and found to carry alright.

Mr. Brazier: I move that the report be accepted and submitted to letter ballot, and the recommendations outlined in the report be adopted.

(*The motion was seconded and carried.*)

## Committee on Train Lighting and Equipment

*The committee has accomplished two things in its report on train lighting and equipment. First, the status of direct drive for car lighting generators is set forth by brief historical notes and by an outline of what the functions of direct drive equipment should and should not be. Second, standards are recommended for train lighting lamps which reduce the number of lamps required for the greater part of car lighting service to four. Regulation limits for lamp regulators are also included.*

*Belts are good and efficient form of drive, for car lighting generators but due to wear and breakage an average of five or six belts must be applied on a car each year. The report includes an interesting and informative table on belts from which belt costs are derived.*

*Many forms of direct drive are described briefly in the report, which were more or less successful but which developed weaknesses before reaching the point at which they could compete with belts. It describes others in the development stage. Only those which are now under test on the road or in the shop are included in the following abstract.*

So far as the committee is aware, the solution of the problem has been attempted by the following, approximately in the order given, although information on this point is not definite.

1. W. L. Bliss.
2. E. I. Deutsch.
3. E. M. Fitz.
4. The Gould Coupler Co.—Chain Drive.
5. The Safety Car Heating and Lighting Co.
6. The Gould Coupler Co.—Shaft Drive.
7. W. A. Pitt.
8. A. H. Matthews.
9. United States Light and Heat Corporation.

### "Safety Car Heating and Lighting Company's" Drive

The "Safety Co.'s" second drive consists of two axle bushings, they being mounted on the axle a little inside the wheel fits. Each bushing carries a collar to which eye bolts are secured.

These eye bolts are connected by means of a helical spring, normally under tension, to a lug on a hollow shaft, the springs being approximately parallel with the longitudinal axis of the axle.

This hollow shaft has a sufficient internal diameter to permit the axle to move freely without fouling the shaft.

This shaft is split and is supported at each end by the outer raceways of four ball bearings, the inner raceways of which are mounted on short shafts carried by the gear housing.

The gear housing is split and is carried by seats turned on each end of the hollow shaft, and is prevented from turning by lugs attached to cross bars fastened to the axle generator suspension irons.

Mounted on the hollow shaft is a split gear meshing with a pinion which is mounted on a short shaft carried on ball bearings, parallel to the axle.

Mounted upon this same short shaft is a bevel gear meshing with a pinion mounted on a second shaft, also carried on ball bearings, perpendicular to the axle.

This second shaft is connected to the armature shaft by means of a split coupling, no universal joints being provided, as the generator is carried on suspension irons attached to the truck frame.

It should be noted that this drive does not require a special axle, and also that no provision has been made for maintaining the pitch circles of the bevel gear and pinion in contact.

So far as is known this drive has never been used in actual service.

### The "Gould" Drive

The "Gould" Shaft Drive, shown in cuts, Figs. 1 and 2, requires the use of a special axle. A circular key ½ inch wide and ¼ inch high is machined on the axle midway between two bearings fits 4½ inches long. A second key ½ inch by ½ inch and 5¼ inches long is fitted in a keyway cut in the axle parallel with the axis of same.

The first key acts to center the split gear on the axle and the second serves to drive the gear. The bearing fits on the axle serve as a seat for the gear box.

The 52-tooth spur gear mounted on the axle meshes with a 36-tooth spur pinion mounted on a shaft, parallel to the axle in the gear box, this shaft being carried on ball bearings.

On this shaft is a 28-tooth bevel gear, meshing with a 20-tooth bevel pinion on a second shaft perpendicular to the axle. This second serves to drive the gear. The bearing fits on the axle serve and at the outboard end carries one part of a universal coupling.

The gear box is split on the horizontal diameter of the axle and is prevented from turning by a member which connects the end of the gear box to the end frame of the truck.

A telescoping shaft carrying on one end the balance of the first universal joint and on the other end a portion of a second universal joint serves to transmit the power to the armature shaft.

Mounted on the armature shaft is a safety device consisting of a coupling carrying a shear pin so that if the generator becomes damaged in any way that will throw an excessive load on the drive, this pin will shear, permitting the drive to run free. This

safety device also forms the balance of the second universal coupling.

Disconnecting this safety device permits the generator to be operated as a motor for testing purposes.

The generator is mounted rigidly on the under frame of the car body with the armature shaft parallel with the longitudinal axis of the car.

Provision is made whereby the position of the bevel pinion can be adjusted so as to maintain the pitch lines of the bevel gears and pinion in contact.

The record of this drive as applied to a car on the D. L. & W. Railroad is as follows:

January 17, 1918. Car No. 582 came out of shop and went in service on local runs.

January 19, 1918. Car journal ran hot, causing car to be cut out for repairs. The opportunity was taken for inspection of internal mechanism and it was found that locking device for jack shaft adjustment had failed, and the locking pin had fallen out and into the grease. From here it traveled with the grease and got into the gears, cutting them badly before it was finally cut to pieces, but damage to gears did not necessitate removal or repair, and after cleaning out all grease and installing an improved locking device, the car went back in service on February 13, 1918, no further trouble with the locking device being experienced.

April 24, 1918. Universal on the generator was greased.

September 16, 1918. Both universals greased, and five pounds of grease put in gear box.

July 19, 1919. For purpose of investigation and inspection, the device was opened up, grease cleaned out and all parts checked up for wear. No wear was noticable on gears, axle bearings, universals, shock absorber or hangers. No dirt or residue of any kind noted in gear case. Back lash on gears normal and all parts functioning properly. All screws and bolts tight and no apparent strain in any part. Refilled with fresh grease and put back in service.

February 20, 1920. Greased universals and put five pounds of grease in gear box.

July 14, 1920. Car came out of shop and the device was opened up for general inspection. After cleaning out the grease, conditions were found as follows:

*Gears.* Back lash normal, wear insignificant, just enough to show point at which teeth were coming into mesh to be properly adjusted. No adjustment necessary on jack shaft.

*Main Bearings.*—Wear slight, not enough to permit passing of 1/64 inch shim 3/8 inch wide. Thrust surface clearance about 1/8 inch, slightly more than on previous inspection.

*Dust Guards.* In good shape, allowing no dirt to enter.

*Universals.* No wear apparent.

*Telescope Joint.* No wear apparent.

*Suspension on Linkage.* No wear apparent and free to swing.

Since the above inspection nothing has been done on this equipment. No expense or repairs other than lubrication and inspection has been necessary to date. At all times the drive has functioned properly, maintaining a steady voltage and amperage output according to the setting of the regulator. No noise is made by the device when operating and the performance up to date has been very satisfactory. A mileage of approximately 100,000 has been attained and the shock and strain due to hard suburban service have been withstood without faults developing. Some improvement as to reducing weight may be possible as well as reduction in size, the present outfit being claimed large enough to drive 15 H. P.

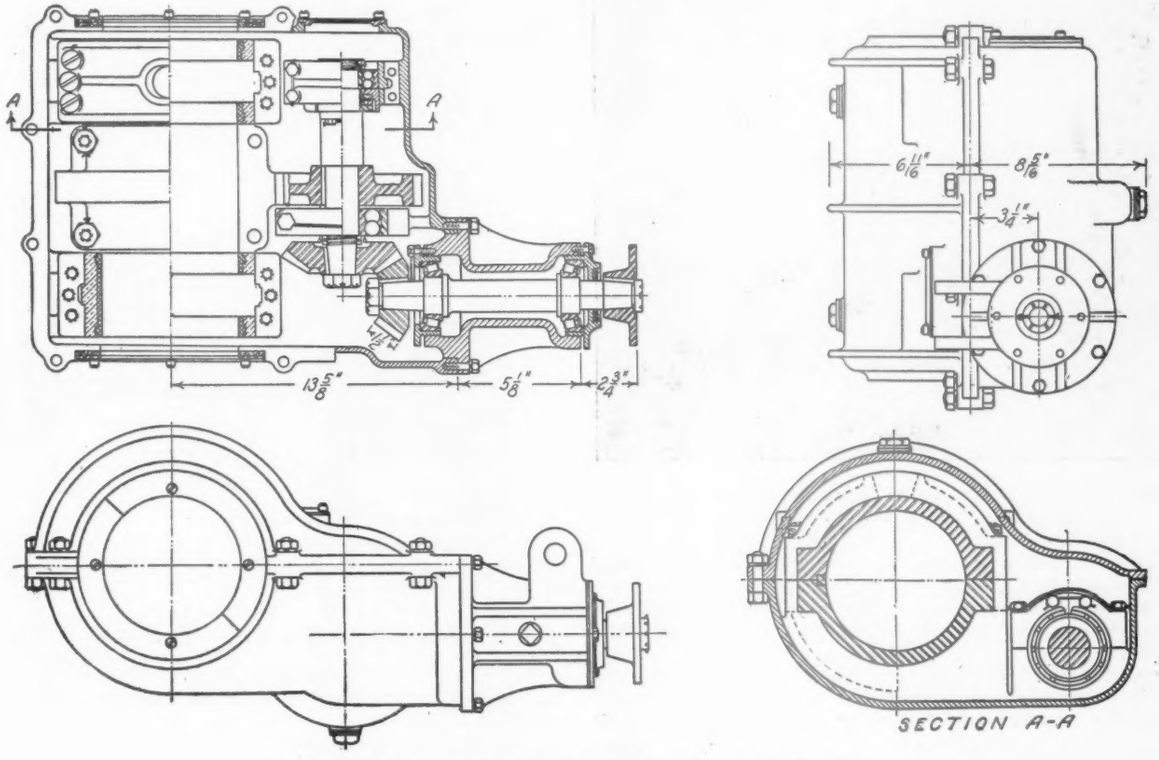



**Fig. 1—Assembly Drawing of Main Part of Gould Drive**

The following is a record of the performance of a similar drive on C. & N. W. diner 2868, applied April, 1920.

Equipment operated satisfactorily until the latter part of July 1920, when the brass collar for adjusting the rear shaft bearing became loose. Repairs were made and the drive worked satisfactorily until the latter part of September, 1920, when the adjusting collar again worked loose. Repairs were made and operation was satisfactory until February 15, 1921, when car was taken in shop, at which time it was found that the adjusting nut had again worked loose.

The equipment was transferred to diner 2888, which is still in shop.

From the time of application to diner 2868 until its renewal, there was no failure of lights.

## "United States Light & Heat Corporation" Drive

The "U. S. L." Drive, as shown in Figs. 3, 4 and 5, consists of a 17-inch split steel pulley secured to a standard axle by means of through bolts.

These pulleys drive by contact two 10-inch pulleys or friction

wheels which are made of rubber tires molded on steel rims, the rims being pressed on the center hub of the pulley.

These tires are the standard tire as used on industrial automobile trucks. These pulleys are mounted on the ends of a short shaft, parallel to the axle, this shaft being supported by two sets of ball bearings which are carried from housing pivoting about a horizontal cylindrical bar in a position approximately vertically above the pulley shaft.

This bar in turn is suported by a steel casting mounted on a member which is supported by the truck frame.

This casting is arranged so that it will pivot in the horizontal plane about a bolt, equalizing the pressure of the friction wheels on the pulleys.

At the center of the shaft carrying the friction wheels a worm wheel is mounted which meshes with a worm mounted on a second shaft perpendicular to the axle. The second shaft is also carried on the ball bearings which are mounted in a casting which

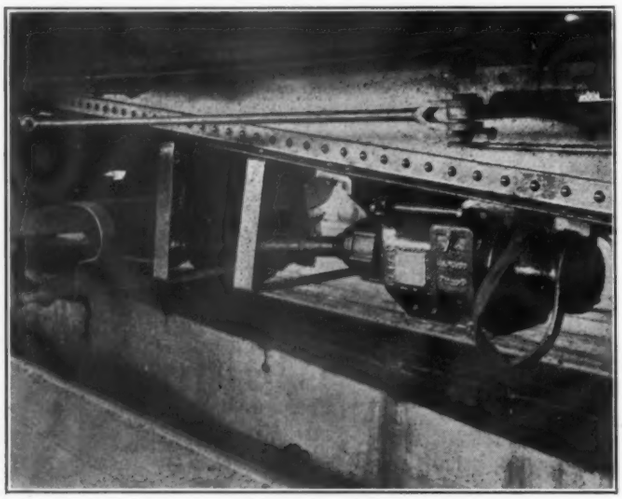


**Fig. 2—Gould Direct Drive Equipment Mounted on D. L. & W. Car**

is bolted to the casting forming the housing for the worm wheel.

This second shaft is connected by means of a universal joint to an extension shaft provided with a sliding joint, and this in turn is connected to the armature shaft by a second universal joint.

The worm shaft is connected to the shaft of the axle generator, which is mounted longitudinally under the car body by means of two universal couplings and an extension shaft with a sliding joint.

Pressure between the pulleys and friction wheels is assured by a bar attached to the housing midway between the pulley, curved so as to pass over the axle and extending beyond the end sill of the truck and having a thread cut on the end.

Beyond the truck frame this rod passes through a helical spring

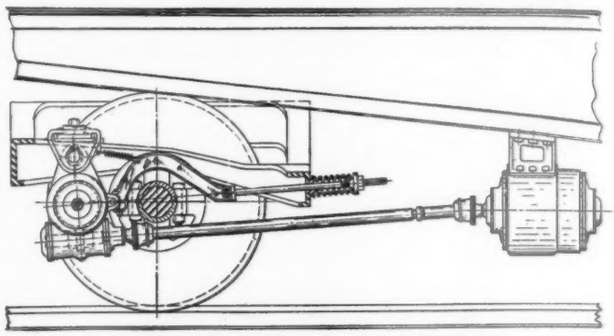


**Fig. 3—Side Elevation of U. S. L. Drive**

and the pressure between the pulley and friction wheel is adjusted by the amount that this spring is compressed.

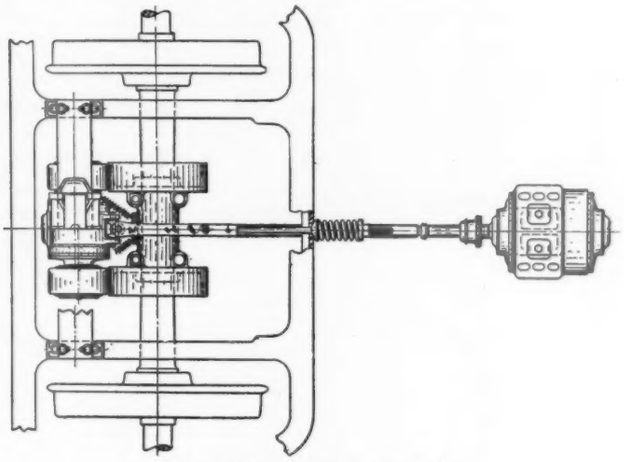


**Fig. 4—Plan of U. S. L. Drive**

This drive has been operating for some time in experimental service in the shop, but has never been used in service on the road.

DATA ON BELTS—BODY HUNG GENERATORS

| Railroad | 1 K. W. NYC | N&W | ACL | 2 K. W. NYC | NYC | NYC | N Y C | B&O | B&O | B&O | DL& | 3 K. W. IC | IC | IC | ACL | ACL | ACL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Make of Generator | Safety | U.S.L. | Safety | Safety | U.S.L. | Gould | Gould | Safety | Stone Frank-lin | U.S.L. | W Gould | Safety | Gould | Gould | Safety | U.S.L. | Stone Frank-lin |
| No. of Generators in Service | 26 | 70 | 6 | 2 | 77 | 33 | 84 | 60 | 92 | 50 | 129 | 126 | 84 | 237 | 11 | 10 | 7 |
| Type of Suspension | NYC | N&W | ..... | NYC | NYC | NYC | N Y C | und frame | Stone | U.S.L. | ..... | und. frame | Gould | I.C. | ..... | ..... | ..... |
| Width of Belt, in. | 4 | 4 | 4 | 4 | 5 | 4 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| Plies of Belt | 4 | 4 | 5 | 4 | 4 | 4 | 4 | 5 | 4 | 5 | 5 | 4 | 4 | 4 | 5 | 5 | 4 |
| Ave. Length of Belt, ft.-in. | 15 | 15 | 13 | 15 | 14–7 | 14–7 | 14–7 | 14–5 | 15 | 14–9 | ..... | 13–6 | 13–6 | 14 | 14–6 | 13 | 13 |
| Type of Fastener | C | W | C | C | C | C | C | W | W | C | C. W | W | W | C. W | C | C | W |
| Diam. of Axle Pulley, in. | 19 | 17 | 17 | 19 | 19 | 19 | 19 | 17 | 17 | 17 | 18 | 17 | 17 | 20 | 17 | 17 | 17 |
| Diam. or Armature Pulley, in. | 8 | 6.5 | 5.5 | 8 | 10 | 8 | 8 | 5.5 | 5.5 | 8 | ..... | 5.5 | 8 | 11 | 5.5 | 8 | 5.5 |
| Belt Renewals in % of cars equipped: | | | | | | | | | | | | | | | | | |
| Oct., 1919 | 8 | ..... | ..... | ..... | 26 | 39 | 30 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Nov., 1919 | 38 | ..... | ..... | ..... | 47 | 42 | 8 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Dec., 1919 | 46 | ..... | ..... | ..... | 100 | 85 | 64 | 120 | 69 | 58 | ..... | 35.5 | 31.6 | 13 | ..... | ..... | ..... |
| Jan., 1920 | 70 | 5.4 | 50 | 50 | 205 | 218 | 140 | 113 | 69 | 42 | 40.5 | 120 | 74 | 57 | 64 | 80 | 29 |
| Feb., 1920 | 35 | 8.6 | 66 | 50 | 102 | 106 | 75 | 77 | 67 | 70 | 30.5 | 65 | 61 | 24 | 64 | 240 | 43 |
| Mar., 1920 | 27 | 7.3 | 50 | ..... | 58 | 63 | 69 | 62 | 64 | 42 | 31 | 67 | 44 | 19 | 73 | 150 | 85 |
| Apr., 1920 | 15 | 8.6 | 16 | ..... | 48 | 60 | 41.5 | 93 | 70 | 30 | 14 | 43 | 51 | 24 | 110 | 20 | 100 |
| May, 1920 | 35 | 7.3 | 66 | ..... | 31 | 30 | 31 | 113 | 54 | 48 | 8.5 | 47 | 45 | 12 | 45 | 30 | 29 |
| June, 1920 | 15 | 5.4 | 84 | ..... | 38 | 30 | 21.5 | 125 | 61 | 38 | 21.6 | 55 | 45 | 19 | 64 | 50 | 29 |
| July, 1920 | 23 | 4.3 | 33 | ..... | 36 | 36 | 22.5 | 88 | 48 | 36 | 31 | 54 | 57 | 22 | 91 | 70 | 29 |
| Aug., 1920 | 42 | 5.4 | 0 | 50 | 40 | 27 | 28.5 | 62 | 73 | 58 | 19.4 | 50 | 61 | 23 | 100 | 20 | 14 |
| Sept., 1920 | 11 | 2.7 | 33 | 50 | 41 | 60 | 21.5 | 75 | 44 | 28 | 4.7 | 51 | 55 | 19 | 54 | 20 | 29 |
| Oct., 1920 | ..... | 1.3 | 0 | ..... | ..... | ..... | ..... | 50 | 55 | 10 | 3.9 | 57 | 52 | 23 | 54 | 70 | 29 |
| Nov., 1920 | ..... | 5.4 | 66 | ..... | ..... | ..... | ..... | 50 | 76 | 26 | 16.2 | 64 | 44 | 20 | 110 | 50 | 43 |
| Dec., 1920 | ..... | 7.3 | 33 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 17 | ..... | ..... | ..... | 128 | 50 | 43 |
| Total Belts applied | 95 | 49 | 30 | 4 | 593 | 264 | 463 | 617 | 694 | 244 | 307 | 894 | 520 | 655 | 105 | 85 | 35 |
| Av. % Renewals per Mo. | 30.4 | 5.8 | 41.7 | 16.7 | 64.2 | 66.6 | 45.9 | 85.6 | 62.7 | 40.7 | 19.8 | 59.1 | 51.5 | 23 | 79.5 | 70.8 | 41.6 |
| Av. miles per belt | 13,759 | 84,775 | ..... | 5,132 | 8,929 | 7,822 | 7,257 | ..... | ..... | ..... | ..... | 17,000 | 20,000 | 44,000 | ..... | ..... | ..... |

## Advantages and Requirements of Direct Drive Equipment

It will be conceded by all who are familiar with present-day operation of axle generators that, at the present time, failure of the drive is the cause of a larger number of failures of light than any other one item.

The records of the company operating the largest number of axle generators show that 18.4 per cent of the lighting failures and 25.2 per cent of the equipment failures are due to the drive.

The causes of the trouble experienced with belt drive are many and various, but they are not germane to the subject assigned.

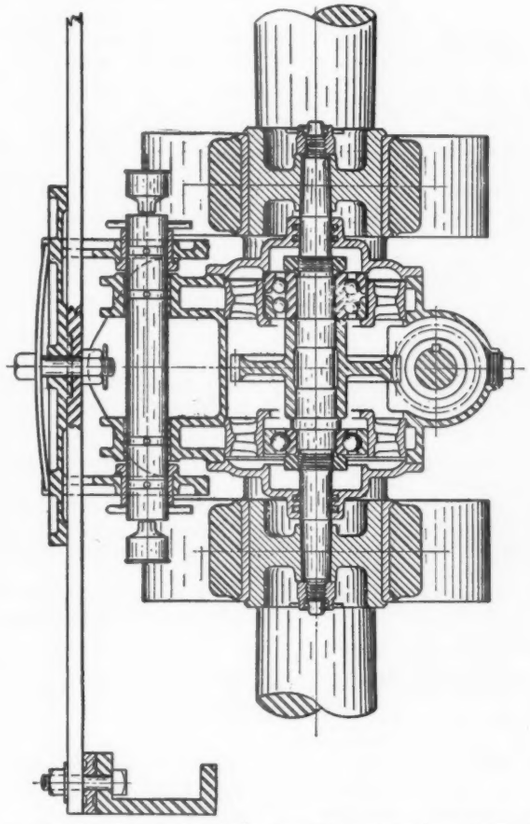


**Fig. 5—Section Showing Details of Construction of U. S. L. Drive**

Their effect on car lighting, however, is and has been so detrimental that, as has shown, repeated efforts have been made to design a satisfactory positive drive which eliminate the belt.

The advantage of such a form of drive are:

1. Decreased liability of failure of drive, resulting in.
2. Decreased liability of failure of light.
3. Decreased liability of deterioration of battery, due to undercharging of battery on account of the belt slipping and sulphating on account of battery becoming discharged and standing in that condition.
4. Decreased liability of having train detentions.
5. Decreased liability of annoyance to passengers, due to flickering of lights caused by belt slipping and to failure of lights due to loss of belt.
6. Positive drive under all conditions of weather.
7. Elimination of belt tension device, simplification of suspension, with consequent reduction in first cost and cost of maintenance of these parts of the equipment.

The disadvantages of such a form of drive are:

1. Increase in first cost of drive.
2. Increase in cost of application.
3. Increase in length of time of train detention when drive does fail.
4. Increased difficulty in testing generator by motoring.

To be really successful, the direct drive should, of course, in addition to its advantages over the belt drive, be capable of being operated at a total cost comparable with the total cost of operating the belt drive.

In order to determine what the cost of operating a belt drive might be, your Committee presents the accompanying data as furnished by various railroads, from which it will be noted that the mileage per belt varies from 5,132 to 84,775, and that the average percentage renewals per belt per month vary from 5.8 to 85.6.

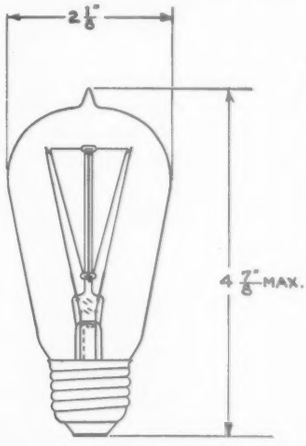



**Fig. 6—15-Watt, 30-34-Volt, S-17 Mazda B Lamp**

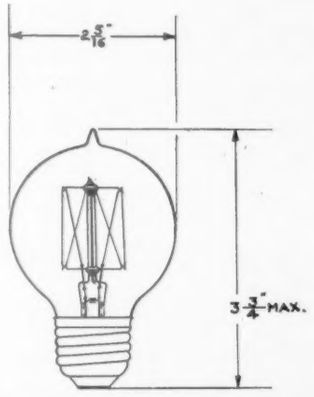



**Fig. 7—15 and 25-Watt, 30-34-Volt, G-18½ Mazda B Lamp**

As the data on belts given in the large table varies so widely on the several railroads, each railroad should, when making such a comparison, make use of its own data.

However, as a guide to arrive at a figure which might represent the cost of operating, we submit the following:

ASSUMPTIONS

| | | |
|---|---|---|
| Miles service per belt | 10,000 | |
| Miles service per month per car | 5,000 | |
| Length, width and ply of belt | 14 ft. 0 in. by 4 in. by 5-ply | |
| Cost per foot of belt | $0.4725 | |
| Type of belt fastener | Crescent | |
| Cost of fasteners per belt | $0.155 | |
| Axle pulley bushing life, cost | 20 yrs. | $ 4.95 |
| Axle pulley life, cost | 10 yrs. | 18.00 |
| Armature pulley life, cost | 3 yrs. | 12.00 |
| Armature pulley times turned, cost per turning 3 yrs. | | .90 |
| Labor to cut and apply belt, time, cost | 20 min. | .28 |
| Difference in cost of suspension, including belt tension device | | 75.00 |

Cost per year based on above Assumptions.

OPERATION

| | | |
|---|---|---|
| 6 14 ft. 0 in. by 4 in. by 5-ply belt, at $0.4725 per ft. | $39.69 | |
| 6 sets of fasteners, at $0.155 per belt | .93 | |
| 6 by 20 minutes for application belt, at $0.85 per hour | 1.70 | |
| Cost of one turning of armature pulley | .90 | |
| | | $43.22 |

DEPRECIATION

| | | |
|---|---|---|
| Axle pulley bushing, $0.05 by $4.95 | $0.25 | |
| Axle pulley, $0.10 by $18.00 | 1.80 | |
| Armature pulley, $0.33 by $12.00 | 4.00 | |
| | | $6.05 |

INTEREST

| | | |
|---|---|---|
| Axle pulley bushing at | $ 4.95 | |
| Axle pulley at | 18.00 | |
| Armature pulley at | 12.00 | |
| Belt at | 2.84 | |
| Fasteners at | .06 | |
| Difference in cost of suspension | 75.00 | |
| Interest at $0.06 on $112.85 | | 6.77 |
| Total | | $56.04 |

Therefore, as an economical proposition, considering the drive only, the direct drive, on the basis of the figures used in making this comparison, should be capable of being operated at a total cost, counting in operation, maintenance, depreciation and interest, at not more than $56.00 per year.

There are, however, other items of expense due to the use of the belt drive which must be considered in making a true comparison.

These items are:

1. Cost of charging current at terminals necessitated by car arriving with batteries discharged due to belt slipping or being lost.
2. Depreciation of battery due to sulphation on account of battery being discharged and remaining for a greater or less time in that condition, due to belt slipping or being lost.
3. Depreciation of battery due to "reserve" material being formed into "active" material before needed, due to sloughing off

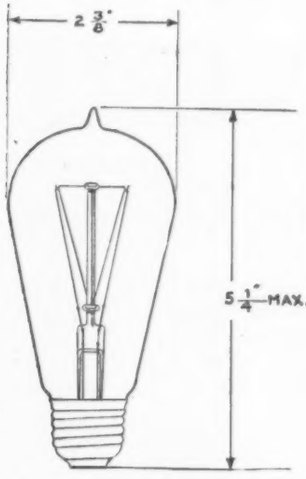



Fig. 8—50 Watt, 30-34-Volt, S-19 Mazda B Lamp

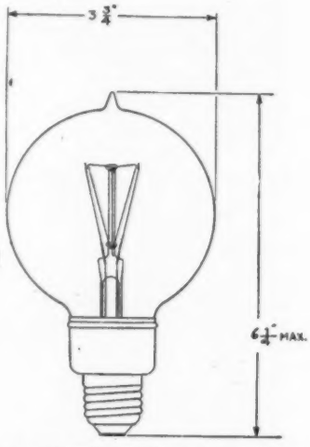



Fig. 9—50-Watt, 30-34-Volt, G-30 Mazda B Lamp

of sulphated active material and "forming" charge resulting from low current to battery caused by slipping of belt.

4. Loss of patronage due to annoyance to passengers caused by the "flickering" or failure of the lights due to defects of the belt drive.

Objections 1, 2 and 3 do not necessarily apply to generators designed to operate with slipping belt.

The points that, in the judgment of your committee, should be avoided in designing a positive drive for axle generators are:

1. Construction which necessitates the use of a "special" axle.
2. Construction which in any way changes a "standard" axle.
3. Construction which necessitates the removal of the wheel from the axle in order that the equipment may be applied.
4. Construction which uses a helical spring in a plane other than that perpendicular to its axis.
5. Construction which, on account of wear, necessitates scrapping of material other than the material worn.
6. Construction which does not provide for maintaining pitch circles of bevel gears in contact.
7. Construction which does not readily permit the turning of wheels in center drive wheel lathes.
8. Construction which does not provide for the full movement of the axle in all planes.
9. Construction that does not provide efficient lubrication and protection to all working surfaces from dirt and grit.

The points that, in the judgment of the committee, should be provided in the design of a positive drive for axle generators are:

1. Connection to axle that can readily be removed.
2. Mounting of the axle generator on the truck or underframe of car in the simplest possible manner.
3. That the universal joints, if used, should have a free angular movement in any direction in excess of the angle between center lines of truck and car body as found on the curve of least radius over which the car is capable of moving in service condition.
4. That a safety device should preferably be provided which will operate to break the connection between the drive and generator, in the event of the drive tending to become overloaded.
5. That the generators should be so mounted as to provide a maximum of accessibility.
6. That means should be provided by which the generator may be readily "motored."

The committee feels that at the present time there is no type of direct or positive drive which does not include features that are objectionable to the extent of practically prohibiting its general use, nor does any drive possess all of the points that we consider necessary.

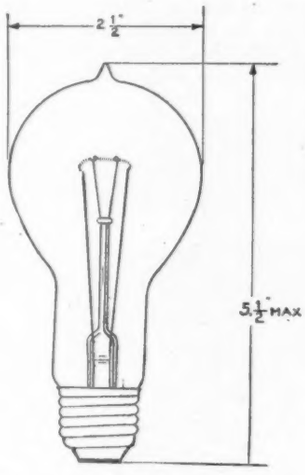



Fig. 10—50-Watt, 30-34-Volt, PS-20 Mazda C Lamp

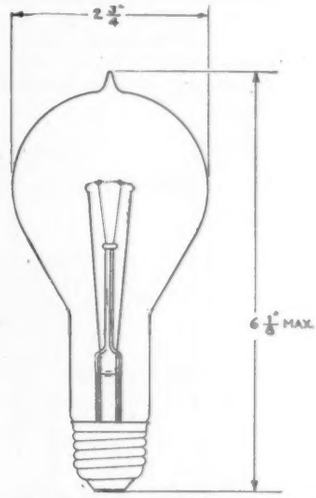



Fig. 11—75-Watt, 30-34-Volt, PS-22 Mazda C Lamp

The committee is, however, of the opinion that the advantages of the direct drive are of such importance as to justify its further development, and further that its use would be justifiable even at a cost in excess of the belt drive.

The committee believes that there is a demand for a direct or positive drive, and that its development should be encouraged by all concerned.

## Specifications for Axle Generators—1920 Report

*Recommended Practice*

There has been more or less criticism of regulation limits as given for the lamp regulator in these specifications under the heading "6. Lamp Regulator (i), 1 and 2."

As 1 now reads, the greater the load on the regulator the greater the permissible drop in voltage.

Due to the characteristics of the battery, the terminal voltage of the battery also decreases as the load increases.

Therefore, we have incurred a double drop in lamp voltage, while what is actually desired is a constant lamp voltage.

As this condition is impossible of attainment under the conditions given, i. e., a battery voltage of 31 volts or less, the obvious thing to do is to set a limit for the maximum conditions which will give the greatest drop permissible and for any conditions less than the maximum the drop in voltage will then be less.

The committee have therefore agreed that paragraph 6 i. 1 should read as follows, the words in parentheses being those of the present text that we eliminate:

> "6 i. 1. With the battery discharging and with the battery voltage 31 volts or less, the drop in voltage across the terminals of the lamp regulator resistance shall not exceed 1 volt (per 25 amperes flowing) for the connected lamp load."

Paragraph 6 i. 2 gives certain voltage limits for a current value to be specified by the railroad company and the note recommends that this current value be 125 per cent of the connected lamp load. There is no necessity for specifying a load greater than will be encountered in service.

The committee has therefore agreed that paragraph 6 i. 2 should read as follows, the words in parentheses being those of the present text that we eliminate:

> "6 i. 2. With armature r. p. m. increasing at an approximately uniform rate from minimum full load speed

to maximum speed in not more than five minutes and again decreasing to its original value, the voltage shall be maintained at .... volts plus or minus one volt (at any current value not exceeding .... amperes) at any current value equal to or less than the connected lamp load."

## Train Lighting Lamps

The present recommended practice shows only the limiting dimensions of two sizes each of two types of bulbs, i. e., the "G" bulb in the 18½ and 30 size and the "S" bulb in the 17 and 19 size. This information does not fully describe the lamps, and furthermore the type "C" lamp has now been developed and with it a new style of bulb has been introduced.

The committee therefore deems it avisable to present a full schedule of train lighting lamps divided into two portions, a standard or regular schedule and a special or intermediate schedule.

From the point of view of cost of manufacture, as well as stocks to be carried by the railroads and the lamp manufacturers, it is desirable to reduce the number of kinds of lamps used for train lighting purposes to a minimum consistent with meeting the requirements for illumination of the various classes of passenger train cars. Table I covers the standard or regular schedule of tungsten train lighting lamps as listed by the lamp manufacturers. Table II covers the special or intermediate schedule of tungsten train lighting lamps which represent lamps that are available but that are not regularly listed by the lamp manufacturers.

TABLE I.
STANDARD OR REGULAR SCHEDULE

| Size in Watts. | Voltages. | Type and Size of Bulb. | Vacuum (B) or Gas Filled (C). |
|---|---|---|---|
| 10 | 30–34 | S–17, G–18½ | B |
| 15 | 30–34 | S–17, G–18½ | B |
| 25 | 30–34 | S–17, G–18½ | B |
| 50 | 30–34 | S–19, G–30 | B |
| 50 | 30–34 | PS–20 | C |
| 75 | 30–34 | PS–22 | C |

TABLE II.
SPECIAL OR INTERMEDIATE SCHEDULE

| Size in Watts. | Voltages. | Type and Size of Bulb. | Vacuum (B) or Gas Filled (C). |
|---|---|---|---|
| 15 | 30–34 | PS–16 | C (Diffusing Bulb) |
| 20 | 30–34 | S–17, G–18½ | B |
| 25 | 30–34 | PS–16 | C (Diffusing Bulb) |
| 50 | 30–34 | PS–20 | C (White Bulb) |
| 100 | 30–34 | PS–25 | C |
| 15 | 60–65 | S–17, G–18½ | B |
| 25 | 60–65 | S–17, G–18½ | B |
| 50 | 60–65 | S–19, G–30 | B |
| 75 | 60–65 | PS–22 | C |
| 100 | 60–65 | PS–25 | C |

The committee believes that the following sizes will meet the general requirements of train lighting service, and that the railroads should confine their demands to these as far as possible.

| Size in Watts. | Voltages. | Type and Size of Bulb. | Vacuum (B) or Gas Filled (C). |
|---|---|---|---|
| 15 | 30–34 | S–17 | B |
| 25 | 30–34 | S–17 | B |
| 50 | 30–34 | PS–20 | C |
| 75 | 30–34 | PS–22 | C |

The straight side or "S" type bulb is recommended in place of the round or "G" bulb on account of its much lower cost. The 50-watt, PS-20 tungsten gas filled or "C" lamp is a comparatively new development, but is recommended in place of the vacuum lamp in that it provides 50 per cent more illumination without increase in current consumption.

The accompanying figures, 6 to 11, inclusive, show the dimensions and shapes of the different styles of bulbs.

The committee recommends:

1. That that portion of their report pertaining to the direct or positive drive on which a report was ordered be accepted.
2. That the proposed change in paragraphs 6 i. 1 and 2 of the specification for axle generators be referred to letter ballot as Recommended Practice.
3. That the schedule of Train Lighting Lamps, together with the limiting dimensions as given, be referred to letter ballot as Recommended Practice.

The report was signed by J. R. Sloan (chairman), Pennsylvania; C. H. Quinn, Norfolk & Western; E. W. Jansen, Illinois Central; L. S. Billau, Baltimore & Ohio; A. J. Farrelly, Chicago & Northwestern; H. A. Currie, New York Central, and E. Wanamaker, Chicago, Rock Island & Pacific.

### Discussion

Mr. Jansen: Your committee in writing this report has described all the various drives of which it had knowledge at the time and included, as will be seen from the report, a drawing showing each drive. The drawings submitted were unfortunately of such a character that they did not lend themselves to reproduction by photographic process and it was, therefore, considered advisable to omit all except those drives which were in commercial use. We have since learned of two other drives, one by D. C. Wilson and one by G. G. Milne, but neither of these has been developed, so far as we know, beyond the patent stage. We have also given a list of what we consider to be the essential features that such a drive must possess, and also a list of the features we consider should be avoided.

With regard to the Gould shaft drives in service, as mentioned in the report, we are advised that the one on the C. & N. W., "has not been opened or touched since March 15, 1921, and has been performing in an entirely satisfactory manner."

The record of the one on the D. L. & W. since July 14, 1920, is,

Jan. 25, 1921: Regreased gear box and universal shaft drive joints.

July 25, 1921: Regreased gear box and universal shaft drive joints.

Feb. 23, 1922: Regreased gear box and universal shaft drive joints.

Two hours labor and eight pounds of grease were used each time.

The equipment has been inspected subsequent to May 24, and considerable wear was found between the main axle and the intermediate gear teeth. The bevel gear showed practically no wear and was in good condition. The wear on the main gear was evidently due to its not being hardened as was the bevel gear.

In the 1918 report your committee recommended that the axle pulley bushing, if one is used, be 7.5 in. in diameter, and not less than 8.5 in. long. Apparently these dimensions were not sufficient, as we learned there is a considerable number of various types and sizes of the bushings called for, the variation between them being slight. This condition tends to increase the cost, and prevents the manufacturer from manufacturing for stock.

Considerable interest is now being manifested in the so-called wide face pulley, the advocates of the same claiming that its use conduces, especially with body-hung generators, to increase the mileage obtained from the belt.

It has been suggested that the committee investigate these two subjects as part of their next year's work and the committee would so recommend.

I want to call your attention especially to the fact that all roads, where they can, should make use of straight-side lamps; they cost considerably less than round lamps. At present the tendency is to get the generators off the truck and on the car body. Members of this committee developed first a heavy cast pulley that occupied the entire axle length. They have changed that and are getting out a pressed steel pulley 18 in. in diameter and are mounting the generators so that the generator pulley is on the center line of the car. I think all railroads should come to that, because it will result in reducing belt loss practically one-half. A test was made on a 23-deg. curve, 224-ft. radius, and on the sharpest point of the curve the belt had still two inches to go before it struck the pulley. The belt at all points rested on the axle pulley, and if it had been a straight-faced axle pulley the outer edge would be against the flange and it would have tended to go over.

The truss rod was offset so as to get the pulley on the center line of the car. A sort of S-form that was at least 1½ in. in diameter and about 6 in. wide was used to take up the strain, and as it was believed that it would not in any way interfere with the brakes, the brake beam was also offset.

The present cost of car lighting can be cut down by taking care of body-hung generators and getting a proper

axle pulley. We are now using 17-in. and 20-in. pulleys, but I believe all roads could go to 18½-in. pulleys, and if they get their clearence for the brake rigging and can get the pulley on the center line of the car and it will greatly reduce the cost. The manufacturers now want you to pay three or four hundred dollars for the necessary dies.

Chairman Tollerton: Any further remarks? If not, the motion that the report be accepted and the changes recommended submitted to letter ballot is now in order.

Mr. Tatum: I move that the report be accepted and submitted to a letter ballot. (*The motion was seconded, put to a vote and carried.*)

(*On motion of Mr. Tatum the meeting adjourned.*)

## A Brave Attempt to Rescue Drowning Man

At 6:30 o'clock last evening a thrilling scene occurred off Young's Million Dollar Pier in full view of hundreds of convention people. A man who later gave his name as F. A. Basford, of New York City, attempted to commit suicide by drowning. He was unobserved at the moment by hundreds of people. He mounted the railing and jumped headlong into the ocean. A life boat did not appear; it remained for a railroad man to prove himself every inch a hero. He was E. S. Smith, master car builder of the Florida East Coast. Mr. Smith hastily stripped off his outer clothing and shoes and, seizing a life preserver, dived headlong from the pier, swimming splendidly 200 ft. towards the drowning man. He had nearly reached him when a life guard boat appeared from the shore and rescued the would-be suicide and took also aboard his courageous rescuer. Mr. Smith deserves untold praise for his splendid efforts, which would have been successful in almost another moment. At the Atlantic City Hospital last night the man Basford was in a precarious condition.

Basford late last night denied that he had attempted suicide. He said he was ill, became dizzy and fell off the pier.

## Railway Club Secretaries Meeting

Members of the Society of Railway Club Secretaries, which has done so much good practical work for the organizations it represents, were in annual session for several hours yesterday morning at the Marlborough. W. E. Cade, Jr., of the New England Club, who has been chairman for the past two years, presided. All the railroad clubs of the country were represented either by their secretaries or by proxy. Daniel M. Brady, founder of the society, was also in attendance.

Problems with which the secretaries have to deal from time to time and endeavor to solve for the advantage of the clubs were as usual a subject of much general discussion. Conclusions were reached which must be recommended to the executive committees of the clubs. If approved and made effective corresponding benefits are expected to follow. The biggest question that came up was the broadening of the work in hand. It had been suggested that a larger society of greater usefulness might be developed for co-operation and mutual helpfulness. The idea met with cordial endorsement and later on a plan of organization will be considered. This will probably be in the latter part of July at a meeting to be held in New York City.

The following officers were elected for the ensuing year: Chairman, W. A. Booth, Canadian Railway Club, Montreal; vice-chairman, Bruce V. Crandall, Western Railway Club, Chicago; secretary-treasurer, Harry D. Vought, New York and Central Railroad Clubs, New York.

After adjournment the secretaries and a number of their superior officers had a delightful round-table luncheon at the Blenheim.

## Registration Figures

The following figures show the registrations for 1922 and 1920. They show complete registrations up to four o'clock of the second day of the respective conventions:

| | 1922 | 1920 |
|---|---|---|
| Members, Mechanical, A. R. A. | 478 | 490 |
| Purchases and stores | 16 | 24 |
| Special Guests | 180 | 190 |
| Supply Men | 1,771 | 1,955 |
| Railroad Ladies | 337 | 344 |
| Supply Ladies | 384 | 490 |
| Totals | 3,166 | 3,493 |

## Program for Today

Division V—Mechanical, American Railway Association, is holding its meetings in the Greek Temple on the Million Dollar Pier.

**Friday, June 16, 1922**

9:30 a. m. to 12:30 p. m.

Discussion of Reports on:

Car Construction.
Couplers and Draft Gears.
Brake Shoe and Brake Beam Equipment.
Train Brake and Signal Equipment.
Car Wheels.

ENTERTAINMENT

10:30 a. m.—Orchestral Concert, Entrance Hall, Million Dollar Pier.

3:30 p. m.—Orchestral Concert with Impromptu Dancing, Entrance Hall, Million Dollar Pier.

4:30 p. m.—Tea will be served in Entrance Hall.

9:00 p. m.—Informal Dance, Canadian Night with Special Features, Ball Room, Million Dollar Pier.

## Exhibit Notes

The name of Charles F. Pierce is to be added to the list of representatives of the Railway Storage Battery Car Company.

The Midvale Steel & Ordnance Company has added to its list of representatives the name of George E. Thackray. The name of Mr. Aertsen was incorrectly spelled in Wednesday's issue. It is Guilliam Aertsen.

The Van Dorn Coupler Company is exhibiting a car-air-electric coupler at Space 38 instead of an automatic coupler as noted in Wednesday's issue.

## Rodger Made Vice-President of the Safety

J. H. Rodger, western manager of the Safety Car Heating & Lighting Company, is receiving congratulations from his friends on his election on Wednesday of this week as a vice-president of the Safety Car Heating & Lighting Company. He will continue to have charge of the western business of his company, maintaining his headquarters in Chicago. He has been with the Safety Company for 11 years.

## President Salinas of Mexican Railways at the Convention

LEON SALINAS, of Mexico City, executive president of the National Railways of Mexico, and F. P. de Hoyos, general agent of these lines at New York, have been attending the convention and looking over the exhibits.

"I have been very much interested in the exhibit," said Mr. Salinas yesterday. "Of course, our railways buy practically all their equipment and supplies in the United States, and the multiplicity of things we are interested in that can be seen on the pier is remarkable.

"The railways of Mexico have largely recovered from the effects of the destruction done during the revolutionary period," Mr. Salinas continued. "We now have about 50 per cent more locomotives than we had before that time and practically an adequate supply of freight cars. There is, however, much of our equipment which is still in need of repair, and we are particularly interested in getting the machinery necessary to be used in making repairs. We have ordered a good deal of it, and will order more as we are able. During the revolutionary period there naturally was not much new machinery bought and the old machinery deteriorated, which of course accounts for our present needs in this respect. Many of our shops also still require reconstruction or repairs.

"Those of our tracks which were destroyed have been entirely rebuilt, and the tracks generally are in satisfactory condition. We have had to get the money for reconstruction and improvements entirely from earnings, and of course this has made our progress in restoring normal conditions slower than it otherwise would have been."

## Registration, American Railway Association, Div. V, Mechanical

Allen, L L., M. M., Gulf Coast Line, Arlington.
Baker, G. T., G. C. Insp., Penn., Worthington.
Bassett, H. M., Genl O. E., N. Y. C., Marlborough.
Bawden, Wm., S. M. P, Term. R. R. Assn., Princess.
Beaghen, Thomas Jr., Mexican Petroleum Corp., Strand.
Bennett, R. C., S. M. P., Penn., St. Charles.
Bentley, W. F., Sp. Insp. Cars, B. & O., Bouvier.
Bibb, Arthur, Chf. Car Drafts., D. & H., Dennis.
Bishop, G. C., S. M. P., L. I., Chelsea.
Boyd, H. H., Asst. Eng. Mech., C. P., Dennis.
Brandt, C. A., Chf. Eng., Superheater Co., Marlborough.
Breaker, E. R., Supt. M. P. M. of Way, S. A. U. & G, 1925 Pacific Ave
Brenaman, H. A., Asst. Wks. Mgr., Penn., Loraine.
Brenholtz, Thos. S., Drafts., A. C. R. R. Co.
Brittain, W. M, Chief Acct., Penn., Grammercy Apt.
Brong, J. E., S. S., L. V., Monticello.
Broughton, M. C., Div. Frt Agt., Penn.
Bucher, G. S., Gen. Car Wks. Penn., Breakers.
Buechler, John A., M. M., D. B. C. & W., 130 St. James Place.
Buist, C. P., M. M., N. O. Public Belt, Traymore.
Burton, T. L., A. B. Engr, N. Y. C., Marlborough.
Butterworth, J. A, Chf Clk, Southern, Strand.
Buzard, E. Y., Trav. Insp., P. & R., Dennis.
Canon, J. M., Retired Mgr. Pullman Co., Kenderton.
Carlton, E. T., C. Insp., L. I., Strand.
Charlton, G. J., Gen. For.., D. L & W, Pennhurst
Clancy, T. P., Genl. Mgr., C. N. Y. S., St. Charles
Clark, F. H., Marlborough.
Coffey, J. E., For. Pass. Equipt., C. R. R. of N. J, Lyric
Craig, Jas. Gen. S. Insp., B. & M., Chelsea.
Crewe, H. P., M. M., A. C. & Y., Sterling.
Cromwell, O. C., Asst. Chf. M. P & Equip., B & O, Chalfonte
Darden, C. M., M. E., N. C. & St. L., Dennis.
Davies, Guy H., Solicitor Legal Dept., Penn., Traymore.
Davis, M. J., Asst. Engr. of M. P., Penn., Chalfonte.
Deeter, Harry E, Asst. For., P. & R., Russel House.
Deiley, J., Asst. Boiler For Insp., Cent. R. R. of N. J., Edison.
Delaney, John, S. M. P., Cum. & Penn.
Dequire, Geo. N., Asst. Mgr., Dept. of Equip., U. S. R .A, Marlborough
Dickert, C. L., M. M., C. of G., Haddon Hall.
Dietrick, J C., F. C. Dept., Penn., Elwood.
Dyer, R. H., Gen. Car Insp, N. & W., Chelsea.
Ebensperger, C. T., Frt. Agt., Penn., 3910 Winchester Ave.
Eklind, C. E., Chf. Drafts., A. T. & S. F., Ambassador.
Ely, E., M. C. B., C. P., Ambassador.
Faris, C. H., Craig Hall.
Faris, J. M., Supt. M. P. & Eng. Dept., Youngstown Steel & Tube Co., Marlborough.
Farr, B J., L. M. P. & C. D., G. T., Marlborough.
Faulkner, J. N., C. C. to Genl.., Penn., Traymore.
Feehan, B., Asst. For., C. R. R. of N. J., Bradv.
Ferry, F. C., M. M., L. H. & St. L., Shelburne.
Fetner, W. H., G. S. M. P., C. of G., Haddon Hall.
Fisher, D. Wallace, Asst. M. E., P. & R., Dennis.
Fisher, Geo., M. C. B., G. T., Traymore.
Fisher, S. W., Supr. Car Service, Nat. Rys. of Mexico, Ambassador
Flynn, J. J., Asst. G. F., N. N. & Southern, Traymore.
Flynn, W. H., S. M. P., M. C., Marlborough.
Frank, C. W., Gen'l. Fore. M. P. Dept., Penna., Mt Carmel.
Fritchey, F. W., M. M., B. & O., Elberon.
Fritts, J. C., M. C. B., D. L. & W., Traymore.
Galloway, W. S., P. A., B. & O., Traymore.
Garcelon, H. I., Asst. Eng. Test, B. & O., Arlington.
Gardner, Henry, Spec. Eng. B. & O., Chalfonte.
Gaston, Jas. H., Formerly M. M., Atlanta & West Point, Traymore.
Geesey, W. R., Towman. Penn., Shelburne.
George, W. A., M. M., Jacksonville Term., Traymore.
Goldsmith, A. C., Gen. For.., Penn., Arcadia.
Goodwin, E. L., Oper. Off., Pullman Co., Arlington.
Grant, J. E., Spec. Agt., Bur. of Expl., Traymore.
Griffin, F. A., Gen'l. Insp. M. P., Erie, Albermarle.
Guyer, Jas. T., Ticket Gateman, L. & N.
Hall, James, M. C. R., S. P., Chalfonte.
Hamilton, A. D., Ins., Inter. Comm. Comm., Elberon.
Hammer, C. A., M. M., Olean, Brad. & Sala., Arlington.
Hamm, W. C., M. E., C. V., Craig Hall.
Hardin, F. H., Chf Engr., N. Y. C., Traymore.
Hardy, W., Genl. For., Cent. R. R. of N. J., Edison.
Harris, C. M., V. P., Hagerstown & Frederick, Traymore
Harrold, J. W., Freight Dept., Penn.
Hatch, M. C. M., M. E., M. K. & T., Strand.
Haverstick, P. W., Supr. Track, Penn., South Carolina Ave. Sta.
Hawman, Allen M., Asst. Ch. Clk S. M. P. P. & R., Sterling
Henley, R. G., M. M., N. & W., Brighton.
Henry, W. C. A., G. S. M. P., Penn., Chelsea.
Hill, Frank J, Ch. Elec. Train Light., M. C., Breakers.
Holmes, Harry, Freight Agt., Atlantic City R. R.
Hood, J. M., Supt., A. C. Y., Strand.
Houston, H. A., Ry Mech Engr, Westinghouse Elec Co., Traymore.
Hunt, R. B., M. E., F. E. C., Sterling.
Hunter, H. S., M. M., P. & R., Bothwell.
Huston, F. T., M M, Penn, Breakers
Irwin, J. E., M. M., Sand Springs, Princess.
Jaynes, R. T., M. M, L. & H. R., Chalfonte.
Jennings, Thomas, S. S., B. & M., Chelsea.
Johnson, W. D., Genl. M. M., B. & O., Shelburne.
Jones, H. W., M. M., Penn., Loraine.
Jones,, W. F., Genl. Store., N. Y. C., Chalfonte.
Katte, Elwin B., Ch. Eng. Elec. Tract., N. Y. C., Marlborough
Keiser, C B., S. M. P., Penn., Brighton.
Kerns, A. U., Shop Insp., Penn.
Kiefer, P. W., Asst. Eng. Car Dept., N. Y. C., Penhurst.
Kiesel, W. F. Jr., M. E., Penn., Chelsea.
Kimmett, M. A., G. F., C. R. R. of N. J., Strand.
Kiney, Wm. A., For. Boiler Maker M. P. & R. E. Dept., P. &R.
Kinkead, J. M., Div. Eng., Penn.
Kittle, W. M., G. F. Car Dept., Penn., Princess.
Koebrick, F. W., For. Pipe Shop, L. I.
Laporte, V., Ch. Loco Insp., C. & N. W., New England.
Lea, C. C., Asst. For. C. R. R. of N. J., Edison.
Leard, H. S., Supv.. Pass. Oper., S. A. L.. Dudley.
Lewis, Thomas, Gen Boiler Insp, L. V., Princess.
Link, A., M. M., M. C., Traymore
Linton, Harvey, Asst. M. M., Penn.
Lovejoy, Geo. R., M. M., D. T., Haddon Hall.
Martin, Mr. L., Ch. A. R. A. Bureau, B. & O., Alamac.
McAlpine, J. D., Trav. Act., N. Y. C., Cheltenham Revere.
McClennan, W. J., Mgr. Rolling Stock R. Dept., A. Hecker Co., Haddon Hall.
McCuaig, D. J., S M. P., G. T., Traymore.
McCue, Thomas B., Asst. For., P. & R., Stanley.
McMullen, John, S. C. Dept., Erie, Traymore.
McMullen, John Jr., Insp., Erie., Traymore.
McVaugh A. S., Maintainer Tel. & Sig., Penn., 3 S. New Hamphire Ave.
Mechling, J. E., S. M. P., Penn., Craig Hall.
Middaugh, W. H., Div. Car For., Erie, Penhurst.
Miller, John B., Asst. For., Atlantic City Ry.
Mitchell, John, G. F., C. R. R. of N. J., Pennhurst.
Monfee, A. J., S. M. P., Birmingham Sou.
Morse, W., L., Spec.Asst. Eng., N. Y. C., Marlborough.
Moses, E. P., Gen. Insp., N. Y. C., Pennhurst
Murray, G. E., E. & M. Eng., G. T., Marlborough.
Myers, Harry E., M. M., L. V., Traymore.
Needman, R. J. M. & E. E., G. T., Ambassador.
Nolan, T. E., Asst. Ch. C. Insp., C. R. R. of N. J., Y. M. C. A.
Northam, B. L., Dennis.
Nosler, Geo. F., Sunt., Am. Ry Exp. Co., Marlborough.
O'Brien, Peter, Chelsea.
Owen, W. J., Chf. Int. Insp., Peoria & Pekin Union, DeVille.
Owens, A. E., Ch. Eng., C. R. R. of N. J.
Poight, T. T., Gen. Oxweld Insp., N. Y., N. H. & H., Traymore.
Paine, Donald E., Clk. Trans. Dept., P. & R.
Pardue, W. J., M C. R., Seaboard Air Line, Traymore.
Parker, G. E., M. E., M. C., Brighton.
Perez, José Cento, Shop Supt. Cuba R. R., Monticello.
Perkinson. T. F., M. M., B. & O., Chalfonte.
Perrine, W. M., M. M. C. R. R. of N. J., Alamac.
Pilcher, John A., M. E., N. & W., Chalfonte.
Poole, P. J., Dist. M. P. Insp., B. & O., Chalfonte.
Porcher, Samuel, Gen. P. A., Penn.
Pratt. L. S., M. M., S. P., Shelburne.
Prendergast. A. D., G. M. Insp., C. of G., Traymore.
Price, C. P., E. S., Canadian National.
Quinn. M. H., G. S. C. R., Erie, Pennhurst.
Rice, W. L., S. S., P & R., Dennis.
Riggs, David, Breakers.
Riggs, J. R., M. M., Penn., Breakers.
Ringberg, E. C., Asst. to M. E, B. & A., Shelbourne.
Ritz, A. L., Asst. C. F., A. C. & Y.
Roberts, John, Supt. M. P., G. T., Traymore.
Romig, T. S., Asst. M. M., Penn.
Scheifele, Leon H., Mach., P. & R., Sterling.
Schum, H. S., G. F., Penn., Loraine.
Schuyler, A. J., G. C. Insp., Virginian, Strand.
Scott, W. L., M. M., Penn, Princess
Sealy, Garrett T. L., Asst. Elect. Engr., P. & R., Clarendon.
Shackford, Jas. M., Chief Drats., D. L. & W., Marlborough.
Shelby C. K., M. M., Penn., Chelsea.
Sicardi E. C., Pres., Union Tank Car Co., Traymore.
Sindall, G. E. M., Asst. Gen. For Cleaning House, Penn.
Sisco, G. E., M. M., Penn., Breakers.

# Conventionalities

Among the visitors at the convention and exhibit yesterday was George C. Taylor, president of the American Railway Express Company.

John Kruttschnitt, assistant mechanical engineer of the Southern Pacific, who is attending the conventions, is one of the three sons of Julius Kruttschnitt, chairman of the Southern Pacific Company.

T. D. Kingsley, sales manager of S. F. Bowser & Co., Ft. Wayne, Ind., will spend the entire week attending the conventions. Mr. Kingsley has succeeded E. M. Savercool, who is now manager of the San Francisco district.

J. B. Michael, master mechanic, Southern Railway, a member of the Master Mechanics' Association since 1887 is here from Selmer, Ala., maintaining his perfect record of attendance in all these years. He has been with the Southern Railway for 37 years.

Mr. and Mrs. W. E. Sharp's sudden departure from the convention on Thursday afternoon caused real regret on the part of their many friends here. They left for Chicago where they were called by the serious illness of an official of Mr. Sharp's Company.

Col. E. M. Hadley, vice-president of the Chicago-Cleveland Car Roofing Company, is attending the convention this year for the first time and pronounces it a grand success. Col. Hadley is actively interested in the Chicago Association of Commerce, being a member of the Illinois Relations Committee.

J. E. Fairbanks, general secretary of the American Railway Association, and Mrs. Fairbanks, expected to attend the conventions, but V. R. Hawthorne, secretary of the Mechanical Division has received a telegram from Mr. Fairbanks saying that he fears because of pressure of other business they will not be able to come.

Ellsworth Haring, like Mr. Gayetty, is having a real vacation this year. It is the first time for many conventions that he has not to do some tall hustling as a committee man. Nevertheless he seems to be doing more than his full part in helping to make things move. Mrs. Haring, as usual, is backing him up in good work.

Two old timers associated with S. F. Bowser & Co., Allan A. Bowser and W. T. ("Bill") Simpson, have not missed a convention for the last 25 years. Mr. Bowser has been connected with the mechanical and engineering departments at Ft. Wayne for 35 years. Mr. Simpson has served in the railroad sales department for 17 years.

The Central Vermont is represented this year by a new mechanical superintendent, H. T. Nowell, who is here with his wife, and a new mechanical engineer, W. C. Hamm. Mr. Nowell was formerly with the Boston & Maine and Mr. Hamm came from the Delaware & Hudson, having previously been with the American Locomotive Company.

Mr. and Mrs. W. T. Tyler are here for the conventions. Mr. Tyler, who was director of operation of the Railroad Administration in 1919 and later vice-president of the Northern Pacific, is now vice-president and general manager of the National Safety Appliance Company, with offices in Chicago. Mr. Tyler was in ill health for some time, but now believes he is fully recovered.

F. A. Schaff, vice-president of the Superheater Company, is one of the convention visitors who recently have returned from Europe, He went over to attend the International Railway Congress at Rome; and after the Congress travelled in various countries. He had a good trip in many ways, but like most recent American visitors to Europe is quite satisfied to be back home.

One of the convention visitors for many years who will be missed this year is C. Haynes Williams. Mr. Williams who was vice-president of the Chicago Railway Equipment Company, died some months ago, after having bravely done his work in spite of serious ill health for a long time. His most intimate friend for years was A. Clark Moore, and Mr. Moore, is also his successor as vice-president of the Chicago Railway Equipment Company.

Superintendent of motive power and equipment J. A. Power, of the Southern Pacific lines, Houston, Texas, and mechanical engineer J. S. Netherwood, of the same road, are attending the conventions. Mr. Power, coming from the country where real honest-to-goodness watermelons grow, refuses to order the luscious fruit at his hotel. He says he is putting in readiness for the watermelon crop 3,000 stock cars and that every car will soon be loaded and sent on its way to the northern markets.

The editor of the *Railway Age,* Samuel O. Dunn, likes nothing better than a good joke himself. His friends are "kidding" him on the loss of an overcoat and perfectly good straw hat somewhere between Chicago and North Philadelphia. The overcoat followed him to Atlantic City, but up to last night the straw hat had not returned. If any one is wearing a hat that doesn't belong to him and the size therein is seven, he will confer a favor on S. O. D. by leaving it at *The Daily* on the Million Dollar Pier. No questions will be asked.

The perfect air ventilation in the ballroom on the pier has been commented on by many this year. Just before the opening of the convention the B. F. Strutevant Company, Boston, made a generous offer to install ventilating fans above the balconies on both sides of the ballroom. The offer said the company would be pleased to furnish the material and do the work entirely without cost to the R. S. M. A. or the pier people. Ten large fans, five on each side, were promptly installed and are now doing the work. The fine work of the Sturtevant company is greatly appreciated.

Whadayathinkathat! H. A. Houston, railway mechanical engineer of the Westinghouse Electric & Manufacturing Company, arrived in the city yesterday with a blushing bride leaning on his arm. Yes! Married Wednesday. After graduating from Purdue, where he held the master mechanics' scholarship from 1907 ta 1911, Mr. Houston took his M. S. degree from the University of Illinois and then spent five years with the Frisco and five-and-a-half years with the Rock Island before he joined the Westinghouse Company in charge of heavy traction locomotive design. Sure thing, have a cigar.

Sir Arthur Conan Doyle, the English novelist, with Lady Doyle and their three children—looking extremely fit—honored the convention Thursday noon by examining the exhibits. Sir Arthur expressed great surprise at the rapidity with which the exhibits were put in operating condition, having witnessed the chaos on the pier but a few days before. His one lament on Atlantic City in general was its "dryness"—and he was not speaking of the weather. May we suggest and *urge* that he put in a hurried call for Sherlock Holmes!

# New Devices Among the Exhibits

## Bullseye Dust Guards

HAIR FIBRE dust guards which are said to be superior to and more durable than the old type of wood guards in car and locomotive truck journal boxes, and yet which can be furnished at approximately the same cost, have been brought out by the Fibreboard Company, Boston, Mass. These dust guards, to which the name "Bullseye" has been applied, are furnished in three styles; plain composition felt, the same guard waterproofed, and one with the hair fibre reinforced on both sides by a jute fibreboard. The last type is recommended for railroads which desire a rigid and long-wearing dust guard.

These guards have been and are now being tested out by a number of railroads. They are said to be giving satisfactory service and are being shown at Atlantic City by Midgley & Borrowdale, Chicago, the Western representatives of the manufacturers.

## Top Vestibule Buffing Mechanism

THE MORTON MANUFACTURING COMPANY, Chicago, is exhibiting an outside buffing mechanism for the top of vestibule diaphragm face plates. The face plate is extended the proper distance from the carline and a bracket is bolted to it as its center. Two connecting rods extend from this bracket diagonally back to two plungers or pistons which work against ½-in. by 2½-in. springs, 7½ in. long, which are held in brackets bolted to the carline. This device is simple and is applicable to all cars, new or old, used in passenger train service. It can be readily and economically installed, as all parts are in plain view and accessible. This also simplifies inspection and replacements.

The mechanism is so constructed that it compensates for the action of the face plates due to the swinging, swaying and bouncing of the cars when rounding curves, passing over rail joints, switches, crossings, etc. For the up-and-down motion of the car, the buffing mechanism is revolvably mounted and the side-sway action is taken care of through the angularity of the connecting rod and plunger, while the inward and outward movement is controlled by coil springs. It eliminates annoying noises within cars caused by the pounding and hammering of face plates and buffing mechanism in the hoods, or grinding and scraping of springs on the carline. This is possible because the blows or strains on the device are received angularly at six points. There is no grinding because each piston receives less than one-sixth of the blow from the face plate. The travel of the piston in its bushing at the carline does not exceed 1 in. to 1½ in. when the face plate is fully driven back.

This device has been tested in service for practically one year, and is said to have stood up satisfactorily under six months of winter service and six months in which the cars were switched and the train made up twice a day, without any of the parts showing appreciable wear.

**Outside Connected Top Diaphragm Buffing Mechanism**

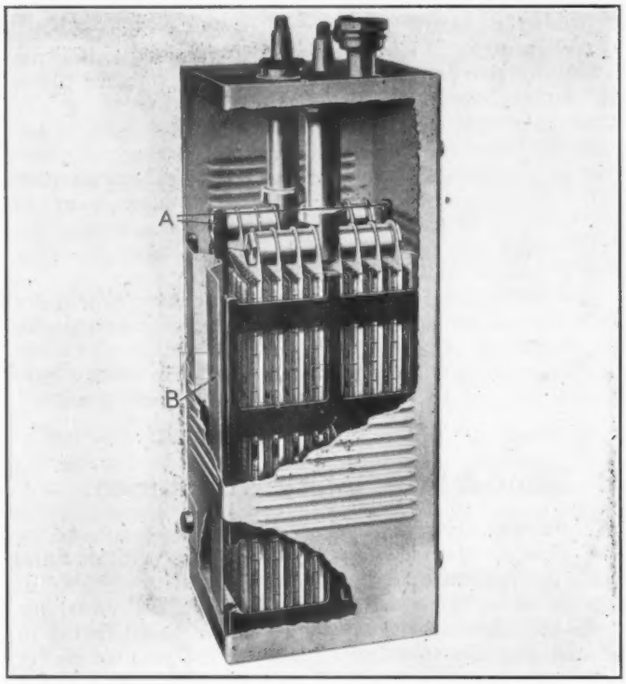
## Hand Brake Safety Attachment

A SIMPLE SAFETY attachment for hand brakes on freight cars is being shown by the Inter-State Safety Appliance Company, Inc., Norristown, Pa. It consists of a rachet wheel and pawl on the underside of the stepboard, the teeth of the rachet wheel facing in the opposite direction from those on the regular rachet wheel above the step-board. A large foot pedal on the step board serves to hold the safety pawl out of contact with the wheel and compresses a spring.

If, while setting up the hand brakes, a brake chain or other connected part should break, the handwheel would start to turn freely. However, the instant the exertion of power on the pedal is released, the spring forces the safety pawl into the teeth of the wheel and prevents further rotation of the hand wheel. As the brakeman would naturally cling to the handwheel, the operation of this safety device would save him from falling.

## Improved Edison Car Lighting Battery

THE EDISON STORAGE BATTERY COMPANY, Orange, N. J., is exhibiting its high-wide cell for car lighting batteries, which is now being introduced to the railroad field. The "HW" type of cell was developed as the result of recommendatons made by railroad car lighting




**Edison "HW" Cell for Car Lighting Service**

authorities and a study of conditions of practical operation which a battery must meet.

The cell is designed with increased space for electrolyte. The design also permits better circulation. These provisions lessen the possibility of high concentration of the solution, and the evils resulting from operation with insufficient electrolyte.

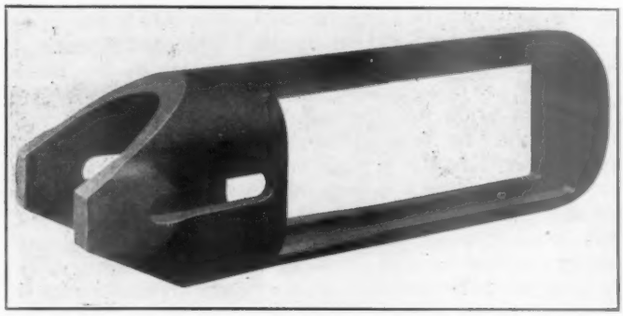
## A Forged Steel Coupler Yoke

A FORGED STEEL DRAFT yoke of the vertical type is one of the innovations at the convention and is being exhibited by the Forged Steel Yoke Corporation, Chicago. This yoke is made by piercing a solid billet under high pressure in a powerful hydraulic press and without any welding or hammering operations. This method of manufacture produces a very dense, close-grained steel. After the yoke has been brought to finished form, it is heat-treated in oil to neutralize any internal strains resulting from the forging operation.

The forging and heat treatment insure yokes of uniform quality, the average physical characteristics of test specimens being as follows: Ultimate tensile strength, 90,000 lb. per square inch; elastic limit, 60,000 lb. per square inch; reduction of area, 34 per cent, and elongation, 22 per cent. With material of the above characteristics, the forged steel yoke has an ultimate breaking strength approximately twice as great as yokes now in use. After heat treatment the ultimate tensile strength is approximately 1,000,000 lb. and the elastic limit about 600,000 lb.

The forged steel yoke meets all A. R. A. requirements as to minimum area and limiting dimensions, being strictly interchangeable with standard cast steel yokes. The straps, which are the points of minimum sectional area, contain 11 sq. in. of metal. The weight is approximately the same as that of cast steel yokes. The standard yoke has a gear opening 24⅝ in. long, but can be made in shorter lengths or special sections for repair work.

The Forged Steel Yoke Corporation is also manufacturing drop forged steel draft lugs. These are lighter than those of cast steel but have more rivet bearing area

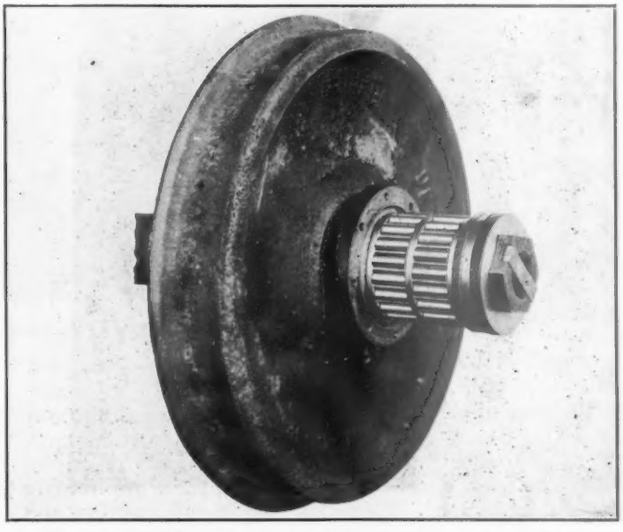


**Coupler Yoke Formed from a Solid Steel Billet**

and are designed to insure properly driven rivets. This is accomplished by a conical ring around each rivet hole which is forced into intimate contact with the web of the center sill when the lug is bolted up and eliminates the possibility of rivet collaring between the draft lug and sill while being driven.

## Roller Bearing Truck

THERE ARE a number of obvious advantages which would be obtained from the use of a satisfactory roller bearing for freight and passenger car journals, provided there was full assurance of high durability. A new design of a roller bearing is being shown this year by the Stafford Roller Bearing Car Truck Corporation,



**Roller Bearing and Thrust Plates Mounted on Axle**

Lawton, Mich., and will naturally attract attention. The rollers for the radial load are mounted in a double-squirrel cage. For a 5-in. by 9-in. journal there are 36 rollers, two sets of 18 each, ¾ in. diameter and 2½ in. long.

These rollers are of chrome steel, oil-treated. Beyond the roller cage toward the end of the axle is a roller thrust bearing which is held between two bearing plates. The entire assembly is secured by a nut on the end of the axle, this nut being secured by a bar lock held by two screws. These parts are shown clearly in one of the photographs. Next to the wheel will be noticed the back cover, oil ring and dustproof plate. The appearance of

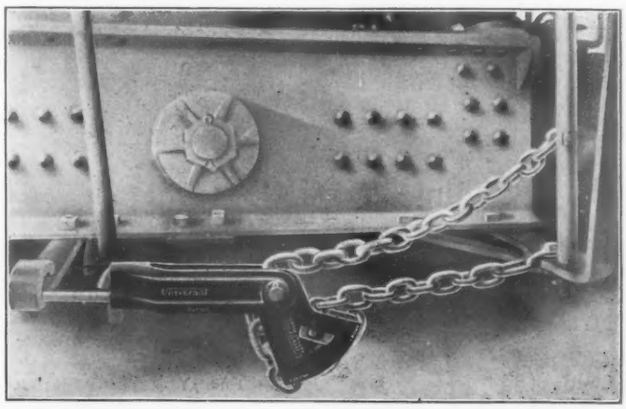
**Appearance of Arch Bar Truck with Stafford Roller Bearing Boxes**

the sealed enclosing box and cover will be noted from the photograph of the complete truck.

A Michigan Central flat car was fitted with Stafford roller-bearing trucks in December, 1920. After making 3,731 miles in transfer yard and logging service, the trucks were transferred in June, 1921, to a gondola car, which made 990 miles in sand and gravel service that season. In January, 1922, the trucks were again transferred to a box car—the one being shown at Atlantic City—and up to April 1 this car had made 3,654 miles in mixed train service. The total distance run has consequently been 8,375 miles. During the period these bearings have been in service they have given no trouble whatever; no hot boxes have developed and no repairs have been found necessary either on the bearings or the journal boxes.

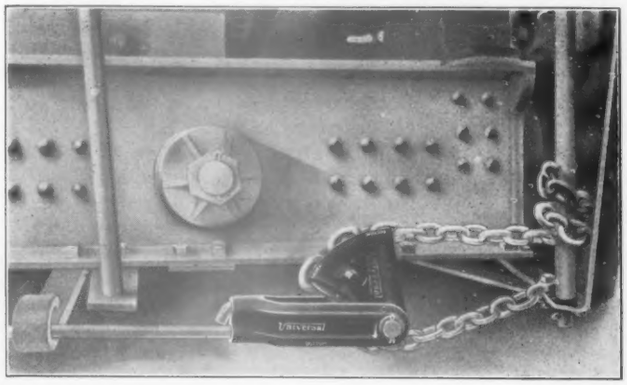
## Universal Hand Brake Attachment

THE ORDINARY HAND BRAKE is commonly an ineffective piece of mechanism, in that it fails to bring the brake shoes into contact with the wheel with the same degree of force as does the air brakes. The hand



**Position in Full Release**

brake attachment furnished by the Universal Draft Gear Attachment Company, Chicago, was designed to obtain an effective hand brake for tank and high capacity cars. This is secured by inserting a properly proportioned cam lever between the ordinary brake staff and the hand brake rod. With this device the slack is quickly

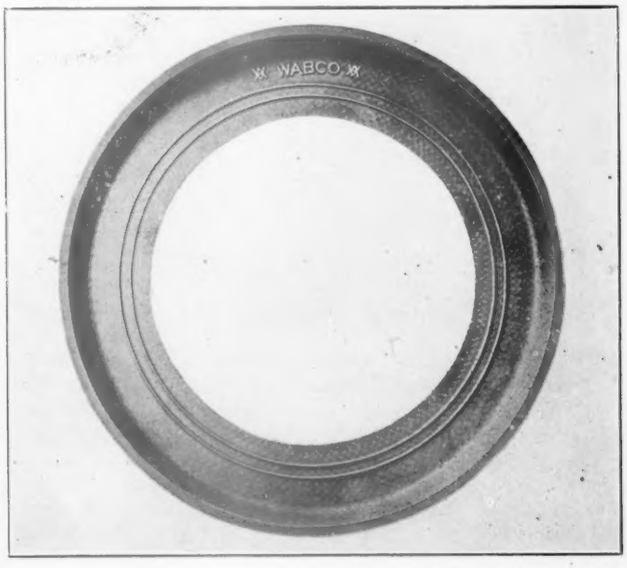


**Position When Brakes Are Applied**

taken up and rapidly released and there is at the same time a considerable increase in the pull delivered to the brake rod. The Universal hand brake attachment is arranged for attachment on the end of the hand brake rod, as shown in the illustration. It is simple, easily attached and effective.

## Brake Cylinder Packing Cup

UNTIL QUITE RECENTLY, leather has been used extensively for packings in air brake cylinders. It has however, been found difficult to keep cylinders absolutely air-tight over extended periods with packings made of even the best grades of leather and treated by




**WABCO Brake Cylinder Packing Cup**

the best possible methods, due to the presence of disintegrating elements such as oil, water, rust, heat, and dirt. Efforts to evolve a substitute material possessing the good qualities of leather with none of its disadvantages have culminated in the development of the WABCO packing

cup by the Westinghouse Air Brake Company, Pittsburgh, Pa.

This packing consists of a special oil-proof composition in combination with a strong open-mesh cord fabric. The fabric is uniformly distributed throughout the section of the cup, each thread being thoroughly imbedded in the composition and the whole accurately molded. The composition offers remarkable resistance to elements which have proven more or less destructive to other forms of packings. Its structure is compact and uniform; air cannot penetrate it either when the packing is first installed or after long hard usage. It is impervious to the action of the usual lubricants and cleaning agents, will not break down under conditions where unusual heat prevails; is tough and durable, and able to resist wear for long periods.

The fabric, around and through which the composition is molded, serves as a skeleton framework to give body to the packing, prevents cracking of the composition under service conditions, adds resiliency and increases the tensile strength. The finished cup is homogenous, tough, sturdy and resilient. It does not become flabby, but is so formed and constituted as to maintain an air-tight contact with the cylinder wall by its own body.

WABCO packing cups are not strictly new but have not been shown at a previous convention; wherever they have been applied, and a number of railroads are already using them exclusively, it is stated that substantial savings in brake cylinder maintenance and improved air brake operation have been noted.

## Record of a Carnegie Rolled Steel Wheel

THE CARNEGIE STEEL COMPANY, Pittsburgh, Pa., in addition to its display of new rolled steel wheels is showing a pair of wheels which were installed in September, 1912, under an all-steel passenger coach weighing 149,200 lbs. They remained in service until finally removed in May,1921, during which period the wheels were turned four times. The total mileage secured was 581,139 miles. The complete record of service follows:

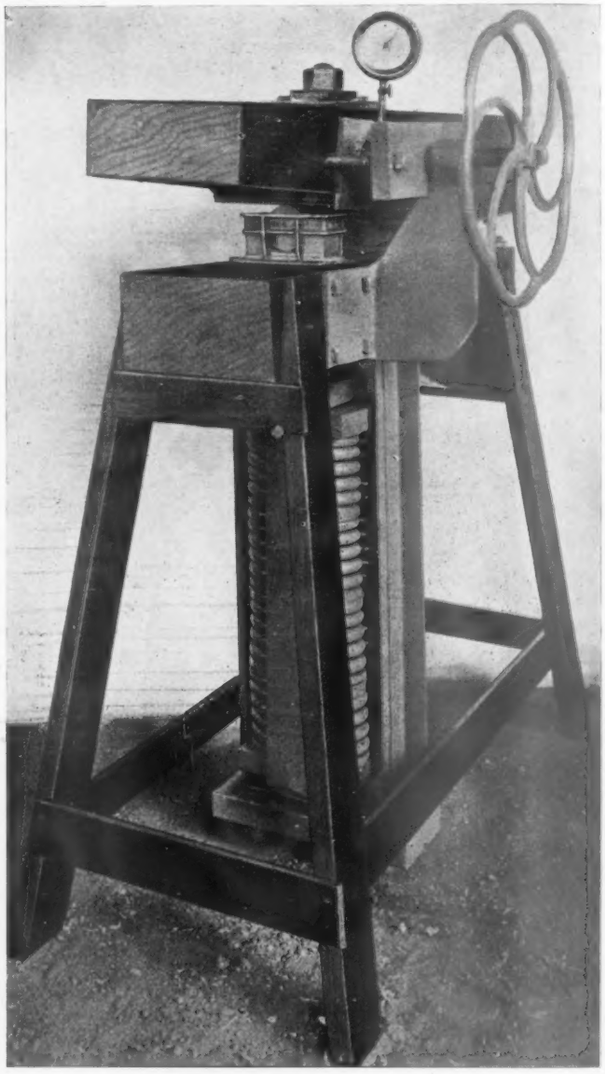
| | | Average Loss of Tread | | |
|---|---|---|---|---|
| Period | Cause of removal | Wear | Turning | Mileage |
| 1 | Slid flat | .02 in. | .30 in. | 2,339 |
| 2 | Worn flange | .18 in. | .22 in. | 102,225 |
| 3 | Worn flange | .20 in. | .11 in. | 90,984 |
| 4 | High flange | .28 in. | .08 in. | 126,880 |
| 5 | High flange | .54 in. | | 258,711 |
| Total | | 1.22 in. | .71 in. | 581,139 |

## Side Bearing Testing Machine

THE ILLUSTRATION shows an interesting and novel machine which has been designed and built by the A. Stucki Company, Pittsburgh, Pa., to show the resistance to the swivelling of the truck due to the friction on the side bearings.

It consists of body and truck bolsters, loading arrangement and measuring apparatus. The truck bolster is placed on a frame at a convenient height for observation, while the body bolster swivels on top of it, pivoted by the usual center plates. Instead of placing the load on top of the bolster, provisions have been made to pull the bolster downward by calibrated springs, which can be tightened or released at will so as to get any desired load at the side bearings. Arrangements have also been made so that different side bearings of the frictionless type, as well as the old fashioned friction blocks, may be inserted between the two bolsters and the force necessary to swivel the body bolster is registered on a gage by means of an interposed oil cylinder and piston.

The results obtained have, of course, developed nothing radically new, as the great amount of friction at the side



**Machine for Determining The Frictional Resistance of Truck Side Bearings**

bearings is known to the railroad world; the machine simply confirms the judgment of railroad officials in using a frictionless side bearing, thereby saving the rails, wheels, power, and avoiding costly derailments.

## Sliding Door Controller

ONE OF THE NEW devices shown by the O. M. Edwards Company, Inc., Syracuse, N. Y., is a sliding car door controller. This not only locks the door in a closed position but automatically holds the door in various open positions. It prevents the door from sliding shut during emergency brake applications or for any other of the various causes for door sliding either open or closed which frequently causes injury to baggagemen and express messengers. The door can be kept partially open for ventilation by use of this device and still be held in a stationary position. It is operated by a handle, and a pull in either direction allows it to be easily moved.